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THE DUHAMEL OPERATION FOR HIRSCHSPRUNG'S DISEASE

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The best operation is that which offers the maximum of benefit with the minimum of interference. It is bad surgery to employ a complicated destructive operation if some simple and conservative procedure will deal efficiently with the condition present.

Charles F. M. Saint⁵

In 1957 Bernard Duhamel,¹ of Paris, described and illustrated in detail a technical modification of the Swenson's operation for Hirschsprung's disease. At the 6th annual meeting of the British Association of Paediatric Surgeons, held in Liverpool in June 1959, he reported on 11 cases of Hirschsprung's disease treated by this technique and claimed that he as well as some French, Spanish and Swiss surgeons found that the functional results were always perfect and that radiological studies showed complete regression of colonic dilatation to a normal diameter in 2-4 months.² At the annual meeting of the British Association of Paediatric Surgeons held at Great Ormond Street, London, in July 1960, Duhamel indicated that his results continued to be excellent,³ and by that time several British paediatric surgeons had adopted the procedure for the treatment of Hirschsprung's disease.

In August 1960 we saw a patient suitable for treatment by Duhamel's operation. This was a Coloured boy of 4 years who had had a previous unsuccessful sigmoidectomy (as recommended by David State⁴). The operation proved to be simple despite the previous surgery, blood loss was minimal, there was a striking absence of operative shock, and his convalescence was remarkably smooth.

In a previous publication¹ it was pointed out that Hirschsprung's disease appeared to be comparatively common in Cape Town, and our experience since that time has confirmed this impression, particularly with regard to 'neonatal Hirschsprung's disease'. We decided, therefore, to conduct a trial of the Duhamel procedure, and from August 1960 until September 1961 have had the opportunity of performing the operation on 15 infants and children. In all fairness to the Swenson procedure,⁵ which we used with very satisfactory results on 42 patients between 1953 and 1960, it must be emphasized that our objective in changing to the Duhamel operation was simply to undertake a clinical trial and not to decry a well-tried and established method of treatment. It is the purpose of this paper to describe briefly the technique of Duhamel's operation and to report our results to date. Comparison of our present results with our results of the Swenson's procedure must necessarily await further trial and a longer follow-up period.

MATERIAL

There were 15 patients. In 7 the aganglionic segment involved rectum and lower sigmoid only (short segment);

in 4 it extended to the mid-descending colon; in 3 the whole of the left half of the colon was affected; and in 1 the disease involved the whole colon and 5 cm. of the terminal ileum (Fig. 1).

DIAGNOSIS

The diagnosis was made on the following criteria:

1. *Clinical presentation.* Nine infants presented with acute neonatal intestinal obstruction. Five of them required emergency surgery during the first month of life—4 colostomies and 1 ileostomy—and in them the appear-

ances of the bowel at operation were typical of Hirschsprung's disease. One of these patients had a subsequent Swenson's operation and one had a subsequent sigmoidectomy performed. Four of the infants were treated conservatively, and their subsequent course was typical of Hirschsprung's disease.

Four infants and children presented later in life, but from the history it was clear that their 'bowel-trouble' dated from birth. One of these had had a Swenson procedure performed elsewhere.

In 2 patients, aged 1½ years and 3 years respectively, the histories were indefinite and could not clearly be dated from birth.

Physical examination in all the older children showed the typical pot-belly with splayed-out ribs, poor nutrition, and an 'empty' rectum.

2. *Barium enema.* This was carried out in 10 patients, and in all of them the typical picture of Hirschsprung's disease was demonstrated (Figs. 2 and 3).

3. *Rectal biopsy.* This was performed on 14 patients by the technique developed at the Red Cross Hospital and described by Shandling⁶ at the 2nd Congress of the South African Association of Surgeons in September 1960. In all of them there was complete absence of ganglion cells. (A rectal biopsy was not performed on the child previously operated upon elsewhere, because the pathologist's report on the excised rectosigmoid was available.)

4. *Biopsy of colon at laparotomy.* This was performed in all the patients, the purpose being to ensure that the proximal line of section was through normal bowel. In 8 of the patients the first biopsy taken from apparently uninvolved bowel (i.e. dilated and hypertrophied), revealed no ganglia, and a more proximal section had to be made

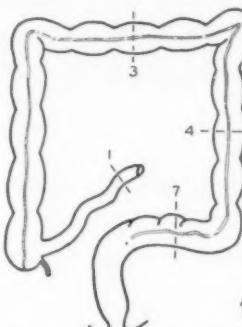


Fig. 1. Hirschsprung's disease—15 patients (see text).

(this was necessary in both patients who had had previous Swenson procedures performed).

5. *Histology of excised colon.* In all but 1 of the patients the aganglionic segment extended proximal to the peritoneal reflection, and therefore the diagnosis could be confirmed by microscopic examination of the operative specimen even though the aganglionic rectum had been left *in situ*.

TECHNIQUE OF THE OPERATION^{1,2}

In 7 patients the operation was performed as a primary single-stage procedure at ages varying from 5 months to 9 years; in 3 patients it was performed as a single-stage corrective procedure after previous failed surgery, and in 4 patients as a two-stage procedure, the second stage consisting of excision of the colostomy (or ileostomy) and the Duhamel operation. In 1 baby colostomy was performed at 3 weeks, the Duhamel procedure at 5 months, and closure of the colostomy at 8 months (Table 1).

TABLE I. DUHAMEL OPERATIONS PERFORMED AT THE RED CROSS WAR MEMORIAL CHILDREN'S HOSPITAL, AUGUST 1960 TO SEPTEMBER 1961

Age at operation	No. of patients
Less than 3 months	2
3-6 months	4
6 months - 2 years	4
Over 2 years	5
Total	15
Single operation	7
Staged operation	5
Re-operation	3

Position

The lithotomy-Trendelenburg position, as used for synchronous combined excision of the rectum, was employed. In older children small Lloyd-Davies leg crutches were used, and in infants and small children improvised rests made of padded Kramer splints. A Foley's catheter was inserted into the bladder and strapped to the thigh.

The Abdominal Approach

Laparotomy was performed through a long, left, lower paramedian incision (in 3 patients this encircled the left transverse colostomy previously made), and the colon was inspected to verify the diagnosis. The lower sigmoid area

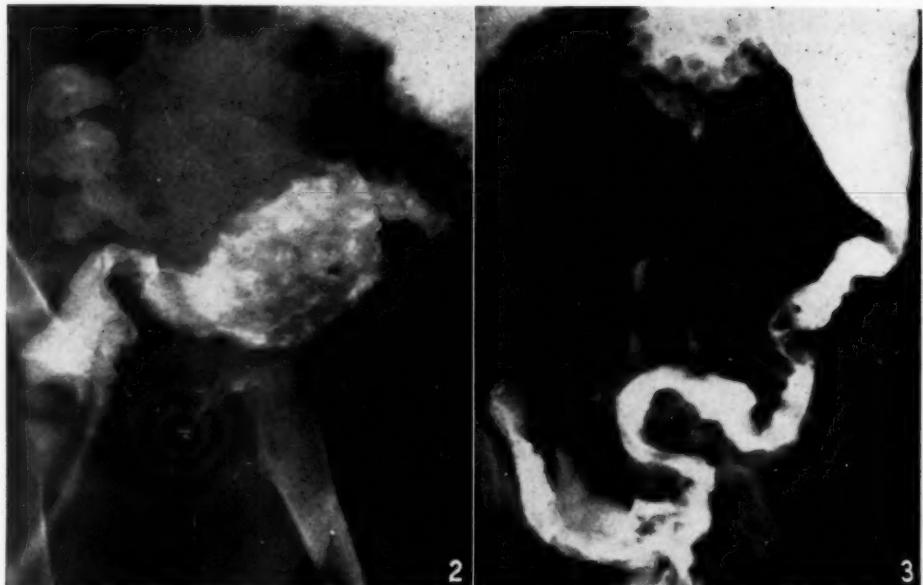


Fig. 2. Barium enema showing typical 'average segment' Hirschsprung's disease. Fig. 3. Barium enema showing 'long segment' Hirschsprung's disease.

was the common site of transition from normal to aganglionic colon. Proximal to the lesion, the colon was dilated and hypertrophied. It then coned down into the narrow segment, the cone of transition usually being about 3-5 cm. long.

After the diagnosis had been checked, the field was cleared by packing the intestines into the upper abdomen and holding the bladder forward by stay sutures steadied by haemostats.

In selecting the proximal level of section due consideration was given to the fact that ganglion cells are absent from the area of coning and often from the most distal 5-15 cm. of dilated bowel. The first biopsy of colonic wall was therefore taken from dilated bowel, approximately 10 cm. proximal to the transitional area. This biopsy was taken as a routine before proximal division of the bowel and sent for frozen section to ensure that the transection was indeed through bowel with normal ganglia.

After careful mobilization of the mesosigmoid by division of congenital bands which fix it to the lateral pelvic wall, the blood vessels in the mesentery were carefully inspected and a suitable vessel earmarked on which to mobilize the bowel.

An incision was then made on the lateral aspect of the base of the mesocolon as it leaves the common iliac vessels, and the left ureter was identified, exposed, and swept laterally away from the posterior attachment of the mesosigmoid. The right ureter was also identified and pushed aside through an incision to the right of the mesocolon. (In small babies the ureters lie very close to the midline and are easily dragged up in the mesentery of the hypertrophied bowel.)

It was usually necessary to mobilize the lower descending colon as well as the sigmoid, and in long-segment cases the mobilization included freeing of the splenic flexure by

the usual incision along its lateral border and division of the gastro-colic omentum.

The mesocolon was then divided. The line of division extended outwards from the point of division of the main blood supply to the margin of the colon selected for transection. Care was taken to skirt the lowermost intact arterial arcade. The colon was then transected between crushing clamps and the proximal end temporarily closed with a running suture, the ends of which were left long (Fig. 4).

The distal colon was then detached from its mesentery up to the rectosigmoid junction and the rectosigmoid angle lifted forward from the promontory of the sacrum. The cellular retrorectal space was opened up by cutting through the mesorectum and blunt dissection carried downwards in the midline using the finger and/or a swab on a holder until the pelvic floor was reached (Fig. 5). (When the dissection is low enough the finger passes over the tip of the coccyx.) A clear presacral plane of cleavage was easily found and the dissection was practically bloodless. By sweeping the finger from side to side this presacral space was enlarged until it was large enough to accommodate 2 or 3 fingers comfortably.

The rectum was then divided between clamps, 1 cm. proximal to the peritoneal reflection, and the specimen removed. The rectal stump was oversewn, invaginated, and covered by pelvic peritoneum as in Hartman's operation for carcinoma (Fig. 11).

The length of the proximal colon was now tested to see whether it could be brought down to the anus. Inadequate length was almost always due to tethering by the blood vessels and could usually be overcome by judicious division of restraining arcades. Sometimes it was necessary to divide a large arterial trunk, such as the left or even the middle colic, in which case more bowel had to be sacrificed. Although the general rule should be to conserve as much colon as possible, attempts at bringing down descending or transverse colon often put an undue strain on the vessels of supply, and in such cases it was deemed wiser to use the ascending colon hinged on the right colic or even the ileo-colic vessels. (In them the appendix was removed as a routine.) Also, in cases where the bowel above the cone was grossly enlarged, the subsequent steps of the operation were facilitated by removal of as much as possible of the dilated bowel along with the aganglionic segment.

At this stage the perineal part of the operation was begun.

While the perineal stage was being completed, the abdominal operator loosely approximated the margins of the pelvic peritoneum around the colon where it descended into the hollow of the sacrum. (The pelvic peritoneal flaps should not be too tightly sutured because of the risk of forming a dead space under the peritoneum.) Neither the sacral hollow nor the peritoneal cavity were drained.

The Perineal Approach

The anus was dilated and the rectal stump thoroughly cleansed by swabbing and irrigation. A special speculum was inserted into the anal canal which kept it wide open without encroaching on its posterior margin. Adrenaline, 1 in 300,000, was injected into the posterior submucous space to reduce oozing during the subsequent dissection. (Swabs soaked in this solution were also used.) (Fig. 6.)

An incision was made along the posterior circumference

of the anus at the line of the ano-cutaneous junction (Fig. 6). Using scissors and the finger, the posterior wall of the anal canal was then dissected off the external sphincters up to the ano-rectal ring (Fig. 7). At the upper border of the ano-rectal ring the dissecting finger was thrust backwards through the remains of the longitudinal coat of the rectum into the previously opened-up retrorectal space (Fig. 5). This opening was then dilated up to about the size of a no. 11-13 Hegar's dilator.

The stage was now set for bringing the colon down to the anal verge. Before this was done, however, 4 or 5 sutures were passed through the distal lip of the ano-cutaneous incision. These were left long and attached to their needles for use in the ano-colic anastomosis to be performed later.

A long, curved haemostat was then introduced through the opening in the posterior wall of the rectum and advanced along the retrorectal space until the points appeared in the peritoneal cavity. The ligatures on the end of the colon were then grasped and by gentle traction on the forceps from below and guidance of the bowel from above, the colon was drawn down behind the rectum and through the gap in the anal wall to the level of the skin incision (Fig. 8). The lower end of the colon was re-opened (Fig. 9) and its posterior margin sutured to the distal lip of the ano-cutaneous incision, using the sutures previously inserted into the latter.

Two Kocher forceps were then applied, one blade into the lower colon, the other into the rectum (Fig. 11). Their points met in a V high up in the bowel and their bases were held apart so that they came to lie at the lateral angles of colon and anus (Fig. 10). The forceps were tightened and tied together. These forceps served not only to crush the adjacent walls of colon and rectum, but also to prevent retraction of the colon and ensure haemostasis. After a few days when the forceps cut through, a longitudinal opening between colon and rectum was produced and a common chamber was formed (Fig. 12).

RESULTS

The postoperative course of all our patients, including the small babies, was remarkably smooth. Operative shock was minimal, and the children remained remarkably comfortable despite the forceps projecting from their anal orifices. There was no urinary retention (the catheter was usually removed at the completion of the operation) and spontaneous stools were passed within 2-4 days. The enterostomy forceps cut out in about a week (3-10 days), when the patients were allowed up and about. Excoriation of the buttocks presented a temporary problem in 2 small babies who had very long segments removed — one had an ileo-rectal anastomosis and the other an anastomosis of splenic flexure to rectum — but this is obviously something which cannot be avoided. There were no deaths or major complications, and none of the children developed post-operative enterocolitis.

It is still too early to assess the long-term results. Suffice it to say that all the children appear to be perfectly continent of faeces and that there have been no urinary disturbances. The older children have normal rectal sensation and are back at school, living perfectly normal lives, while the tiny babies have tolerated the operation very well and are thriving. Postoperative radiological studies

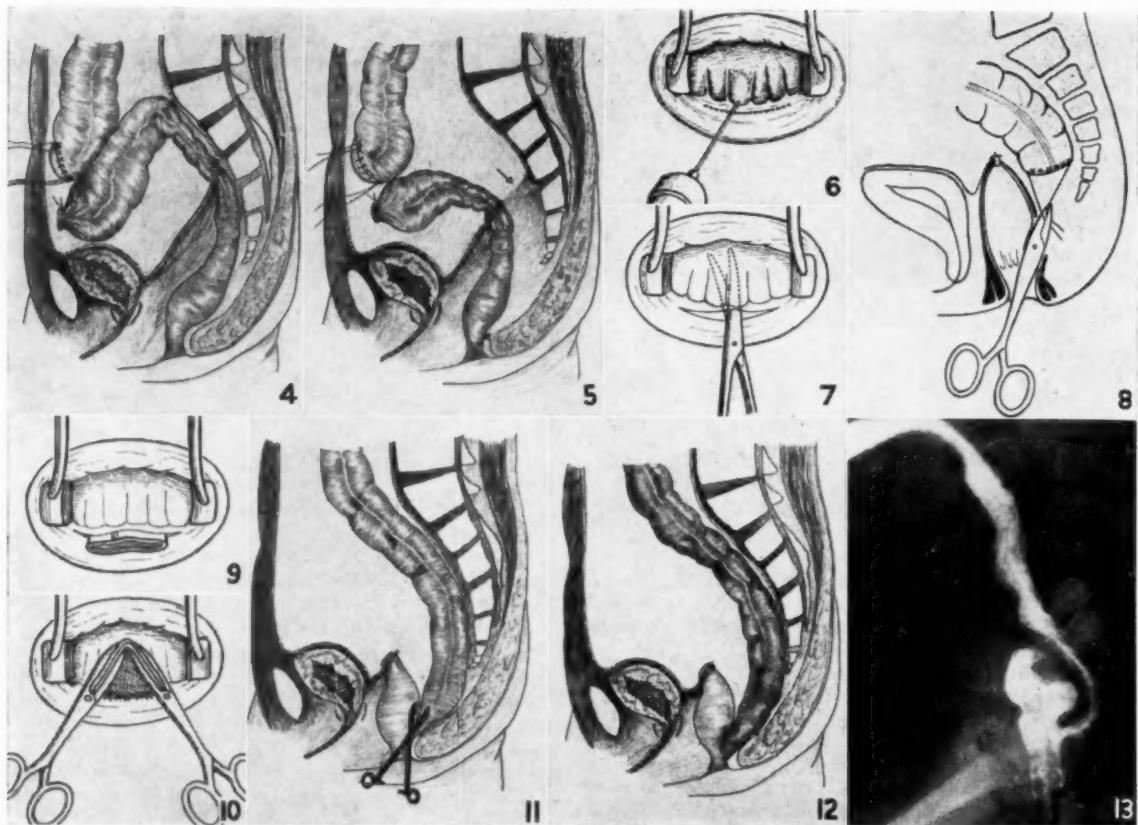


Fig. 4. The sigmoid colon has been divided 10 cm. proximal to the 'cone of transition'. The distal cut end has been ligated and the proximal cut end temporarily sutured. Fig. 5. The recto-sigmoid has been drawn forward away from the sacrum and the cellular retro-rectal space entered (upper arrow). The lower arrow indicates the site where the retrorectal space will be entered from below at a later stage. Fig. 6. The anus is held open by means of a speculum and the posterior wall infiltrated with 1 in 300,000 adrenaline to reduce bleeding. The dotted line indicates the line of incision along the posterior circumference at the ano-cutaneous junction. Fig. 7. The incision is deepened between the external and internal sphincters by scissors-dissection to separate the posterior wall of the anal canal from the external sphincter. Fig. 8. The mobilized colon is drawn down behind the rectum and through the gap in the posterior anal wall to the level of the skin incision. Fig. 9. The lower end of the colon projecting into the anal canal has been re-opened and redundant bowel removed. Fig. 10. The points of the crushing forceps meet in a V high up in the bowel and their bases lie at the lateral angles of colon and rectum. Fig. 11. The posterior wall of the 'pulled through' colon has been sutured to the distal lip of the ano-cutaneous incision, and Kocher forceps have been applied to crush the adjacent posterior rectal and anterior colonic walls. Note that the rectal stump has been oversewn and peritonealized. Fig. 12. The final result. The crushing forceps have cut through leaving a wide opening between rectum and colon. Fig. 13. Postoperative barium enema showing the colon entering the lower end of the rectal stump. Note that the colon is normal in calibre.

after intervals of 1-3 months have shown complete regression of colonic dilatation (Fig. 13). Even at this early stage, therefore, we feel that the results are most encouraging. We agree with Duhamel that the operation has the following special advantages:

1. Extensive pelvic dissection is avoided.
2. The nerve supply of the bladder is not disturbed.
3. Rectal sensation is preserved.
4. A wide anastomosis is performed.
5. Separation of the anastomosis is minimized.
6. It is suitable as a re-operation after previous failed surgery.
7. It is safe during the first few months of life.
8. Early ileo-rectal anastomosis is possible in patients with aganglionosis of the entire colon.

In view of the above we feel that this *simple and conservative procedure will deal efficiently with Hirschsprung's disease*, and we intend continuing with the clinical trial.

I wish to thank Dr. J. F. W. Mostert, Superintendent of the Red Cross War Memorial Children's Hospital, for permission to use the hospital records, and Messrs A. Katz and R. van der Riet who operated on 3 of the patients in this series. I am indebted to Mrs. P. Kottler and Mrs. H. L. F. Currey for the diagrams and to Mr. G. McManus for the photography.

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VAN DIE REDAKSIE : EDITORIAL

HONSDOLHEID IN SUID-AFRIKA

Hierdie onderwerp is nog nie weer sedert 1949¹ in hierdie *Tydskrif* bespreek nie. Tot op die huidige oomblik is daar egter sewe gevalle van menslike sterfte gedurende 1961 aangemeld by die Staatsgesondheidsdepartement. Hierdie syfer verteenwoordig 'n aansienlike verhoging van die jaarlike aantal menslike sterftes van hierdie siekte bo-die van die afgelopen tien jaar. Die verhoogde voorkoms van menslike sterftes van hondsdolheid gedurende hierdie jaar baar groot onrus, veral nadat die siekte onlangs vir die eerste keer in Piketberg, in die Kaapprovinsie, aangemeld is gedurende Oktober. Die siekte het ook op aansienlike skaal uitgebreek in Natal. Gedurende die afgelope tien jaar is slegs enkele gevalle van verdagte hondsdolheid uit hierdie Provinsie aangemeld. Die distrik van Piketberg en Natal is altwee deur die Staatsveeartsenydienst tot gebiede verklaar waarin hondsdolheid voorkom.

Die manier waarop die onlangse hondsdolheid-infeksie versprei en die redes waarom dit nou weer voorkom, is nie bekend nie. Die hoof-reservoir van hondsdolheid in Suid-Afrika behoort tot die wilde dier-soort *Viverridae*.^{2,3} In die volgende tabel word die aantal verdagte menslike gevalle van hondsdolheid wat met entstof behandel is en die betrokke dier-vektore aangegee.

Jaar	Aantal verdagte gevallen van hondsdolheid wat in Suid-Afrika met entstof behandel is	Verantwoordelike dier				
		Hond	Kat	Bees	Mierkat	Ander
1959	97	46	20	26	1	4
1960	61	24	15	10	5	7
1961 (tot einde Okt.)	71	26	11	12	8	14

Uit die bogemelde syfers blyk dit dat die meeste menslike gevalle voorkom as gevolg van kontak met huisdiere. Die huisdiere is waarskynlik intermediêre virus-vektore tussen die hoof-reservoir, *Viverridae*, en die mens.

Ons sou die onlangse tendensie in die patroon wat hondsdolheid in Suid-Afrika vertoon, waarskynlik kan opsom in terme van die volgende oorwegings:

1. 'n Groot verhoging van die voorkoms van virus-infeksie onder die *Viverridae*, met 'n gevoldlike vermeerderde oordraging na huisdiere en mense.
2. 'n Variasie van die giftigheid van die wilde virus met verhoogde soort-patogeniteit by diere en mense.
3. Oordraging van die virus deur roofvoëls en vlermuise.

Met betrekking tot die laaste oorweging moet dit vermeld word dat vlermuise-hondsdolheid nie in Suid-Afrika beskryf is nie, waarskynlik as gevolg van die afwesigheid van die vampier-vlermuise in dié gebied. Copley het vir die W.N.N.R. en in medewerking met die Veeartsenydienst Laboratoriums van Onderstepoort onderzoek ingestel na die moontlikheid dat hondsdolheid voorkom by grotvler-

muise — met negatiewe resultate. Ten spyte van hierdie negatiewe bevindings behoort ons egter gedurig op ons hoede te wees in hierdie verband.

Die patogenese van hondsdolheid by mense en diere is nog nie heeltemal duidelik nie. Dit is goed bekend dat die virus neurotropies is, maar die presiese manier van verspreiding langs die perifere senuwees na die brein toe is nog nie vasgestel nie. Onlangse bevindings insake poliomielitis duis aan dat die virus, nadat dit toegang gevind het tot die liggaam, in die weefsels buite die senuweestelsel vermenigvuldig en gevolg word deur viremie. Schindler,⁴ in 'n eksperimentele studie met gefikseerde hondsdolheid-virus, het gevind dat die virus van hondsdolheid val die sentrale senuweestelsel aan sonder 'n vermeerdering by die ingangspunt en sonder enige vasstelbare viremie'.

Sir Macfarlane Burnet⁵ meen dat die probleem heroorweg moet geniet in die lig van veranderde opvattinge oor die analoë proses in poliomielitis en eksperimentele herpes simplex.

Die mekanisme van infeksie van die speekselkliere is ook nog nie heeltemal duidelik nie. Die aantasting van speekselkliere sonder infeksie van die sentrale senuweestelsel is nog nie beskryf nie.

Die Staatsgesondheidsdepartement word as lid van die Wêreld-gesondheidsorganisasie op die hoogte gehou — deur die W.G.O. — van die onlangse vooruitgang van onderzoek in verband met hondsdolheid. Die W.G.O. tree ook in adviserende hoedanigheid op oor die metodes van immunisasie wat by die behandeling van pasiënte gevold moet word.

Die behandeling van menslike kontakte by hondsdolheid hoort by die Staatsgesondheidsdepartement met sy netwerk van distriksgenesesphere huis. Daar is geen praktiese tegniek beskikbaar wat geskik is vir die definitiewe diagnose van hondsdolheid in pasiënte net nadat hulle aan die siekte blootgestel is nie. Vinnige mediese optrede is dus absoluut noodsaaklik in persone van wie dit gemeen word dat hulle na blootstelling die gevaar loop om hondsdolheid te mag kry. Noodhulpbehandeling gevvolg deur immunisasie-procedures met serum en entstof teen hondsdolheid moet dus dadelik in werking gestel word.

Ensefalitis wat volg op die toediening van entstof vir hondsdolheid kom soms voor as 'n komplikasie by die behandeling met Semple se konynebrein-entstof (wat met ultraviolet-lig bestraal is en deur die gesondheidsdepartement uitgereik is). Indien moontlik, word hospitalisasie van die pasiënt aanbeveel.

Die behandeling van entstof-ensefalitis met steroïdes is ook beskryf. In die geval van een pasiënt is herstel gerapporteer na die toediening van hierdie middels.⁶ Daar word egter ook gedink dat hierdie middels verantwoordelik is vir die belemmering van die immunologiese respons tot hondsdolheid-entstof wat aan 'n persoon toegedien is.⁷ Ver-

dere ondervinding met steroides in die behandeling van encefalitis wat volg op die toediening van entstof vir hondsolheid skyn nodig te wees om hul nuttigheid vas te stel.

Die voorkoming van hondsolheid in persone wat geel blootgestel word aan die risiko van infeksie is 'n onderwerp wat heelwat aandag geniet. 'n Ongangse aanbeveling van Greenberg en Childress⁸ gee aan die hand dat eend-embrio-entstof gebruik moet word in plaas van brein-weefsel-entstof by die voorkomende behandeling van hondsolheid.

Die maatreëls wat toegepas moet word vir die beheer van uitbreiding van hondsolheid, is in die V.S.A. beskryf.^{9,10} Sulke maatreëls veronderstel die hoogstegraad van samewerking tussen mediese en veeartsenkundige dienste. Beheermaatreëls kan soos volg opgesom word:

1. Die vorming van aksiekomitees in die betrokke gebied.
2. Die voer van aktiewe publisiteitskampanjes oor die radio en in die pers.

RABIES IN SOUTH AFRICA

This is the first discussion on rabies that has appeared in this *Journal* since 1949.¹ On going to press, seven human deaths from rabies infection have been notified to the State Department of Health during 1961. This figure represents a marked increase over the preceding ten years in the annual number of deaths from this disease, and is regarded with concern. More particularly so, since the first recorded outbreak of rabies in the North West Cape occurred at Piquetberg during October. Another extensive outbreak of rabies has been reported from Natal, while over the ten previous years only an occasional case of suspected rabies has been notified from this Province. Both Piquetberg and Natal have been declared rabies-infected areas by the State Veterinary Service.

The mode of spread of recent rabies infection to the North West Cape and reasons for the increased prevalence of the disease in Natal are not known. The main reservoir of rabies infection in South Africa is the wild-life animal species *Viverridae*.^{2,3} Notifications of the number of suspected human rabies cases treated with vaccine over the last three years and the animal vectors responsible are reflected in the following table:

Year	Notifications of suspected humans treated in South Africa	Responsible animal					
		Dog	Cat	Bovine	Merkat	Other	
1959	97	46	20	26	1	4	
1960	61	24	15	10	5	7	
1961 (to 1 Oct.)	71	26	11	12	8	14	

The abovementioned figures indicate that most human cases occur as a result of contact with domestic animals, the latter probably being intermediate virus vectors between the main reservoir in *Viverridae* and man.

It seems reasonable to postulate that recent trends in the

3. Die oprigting van nood-klinieke vir die inenting van honde.

4. Die invoer van streng afsonderingsregulاسies.

5. Die aanhou van diere wat rondloop, in geskikte plekke, vir afsonderingsperiodes van ten minste ses maande.

6. Toesig oor wilde diere in epidemiese of ensoötiese gebiede, en die beheer van wilde roofdiere en vektorbevolkings.

7. Spoedige mediese behandeling van menslike kontrakteur deur verantwoordelike mediese autoriteite.

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pattern followed by rabies infection in South Africa could be assessed in terms of the following considerations:

1. A marked increase in the incidence of virus infection among the wild-life species *Viverridae*, with a consequent increased transmission to domestic animals and man.

2. A virulence variation of the wild virus with increased species pathogenicity in domestic animals and man.

3. Transmission of virus by predatory birds and bats.

With regard to the third consideration it must be stated that bat rabies has not been described in South Africa, probably because of the absence of the vampire bat species in this region. Copley, on behalf of the Council for Scientific and Industrial Research, and in collaboration with the Onderstepoort Veterinary Laboratories, has investigated the possibility of rabies infection in cave bats with negative results. Nevertheless, despite these negative findings, constant vigilance should be maintained and encouraged in this field.

The pathogenesis of rabies infection in man and animals is not clearly understood. That the virus is neurotropic in activity is well known; however, the precise manner of spread along the peripheral nerves to the brain has not been established. Recent findings in relation to poliomyelitis virus indicate that this virus, after gaining access to the body, multiplies in tissues outside the nervous system and is followed by viraemia. Schindler,⁴ in experimental studies with fixed rabies virus, has found that 'the rabies virus attacks the central nervous system without an increase at the portal of entry and without any detectable viraemia'.

It is the opinion of Sir Macfarlane Burnet⁵ that 'the problem needs re-examination in the light of changing views about the analogous process in poliomyelitis and experimental herpes simplex'.

The mechanism of salivary-gland infection is likewise not fully explained. Salivary-gland involvement in the

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absence of central-nervous-system infection has not been described.

The State Department of Health, as a member of the World Health Organization, is kept informed by this body of recent advances in rabies research. The WHO also acts in an advisory capacity on the methods of immunization to be adopted for the treatment of patients.

Treatment of human rabies contacts is the responsibility of the State Department of Health through its network of District Surgeons. For practical purposes no laboratory technique is at present available whereby a definite diagnosis of rabies infection in patients can be established immediately following exposure to the risk of the disease. Therefore prompt medical action is absolutely imperative in persons who have been assessed as a definite exposure risk to rabies virus infection. First-aid treatment followed by immunization procedures with antirabies serum and vaccine should be instituted immediately.

Post-rabid vaccinal encephalitis does occur as a complication in treatment with the Semple-type rabbit-brain vaccine (ultraviolet-light irradiated) issued by the Department of Health. In order to counteract this complication it is recommended that patients should be carefully observed throughout the period of treatment. If possible, hospitalization of patients is advised. The treatment of post-rabid vaccinal encephalitis with steroid drugs has been described, and in one patient dramatic recovery is reported to have followed the administration of these agents.⁶ On the other hand, these agents are also believed to have been responsible for impairment of immunological response to the administration of rabies vaccine in a reported human case.⁷ Further experience with steroid drugs in the treatment of post-rabid vaccinal encephalitis seems necessary in order to ascertain their usefulness.

The prophylaxis of rabies in persons regularly exposed to the risk of infection is a subject which has received considerable attention. A recent recommendation advanced by Greenberg and Childress suggests that duck-embryo vaccine should supplant the use of brain-tissue vaccine for the prophylaxis of rabies infection.⁸

Measures to be adopted for the control of rabies outbreaks have been described in the USA.^{9,10} Such measures call for the highest order of cooperation between the medical and veterinary services.

Control measures can be summarized as follows:

1. The formation of action committees in the affected areas. Such committees to be advised by medical and veterinary staff.
2. The promotion of energetic publicity campaigns by radio and press organizations.
3. The siting of emergency dog-vaccination clinics.
4. The introduction of strict quarantine regulations.
5. Control of stray animals by isolation in suitable premises for quarantine periods of at least six months.
6. Wild-life surveillance of epidemic and enzootic areas with control of predatory wild-life and vector populations.
7. Prompt medical treatment of human contacts by the responsible medical authorities.

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DIABETES, THIOL SUBSTANCES AND DIABETOGENS*

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Diabetes is by no means a new clinical problem. I well remember visiting the tombs at Sakkara in Egypt in 1945, and being shown a mural which depicted Betahotep, the Egyptian physician, tasting a specimen of urine in order to test it for glycosuria! Times may have changed since then, and also our ideas on diabetes, but the concept that the pathogenesis of diabetes is related to some form of intoxication of normal body function is by no means new. In this paper I hope to review, very briefly, some present-day concepts.

INTRODUCTORY DEFINITIONS

Diabetes Mellitus

There is no completely satisfactory textbook definition of diabetes mellitus, and for the purposes of this paper my definition is based on that in Simpson's textbook.¹¹ Diabetes mellitus is a chronic metabolic disorder characterized

by deficiency of insulin which may be absolute or relative, and manifested clinically by a syndrome of altered carbohydrate, protein and fat metabolism (i.e. hyperglycaemia, glycosuria, protein depletion and wasting of tissues in some cases, gluconeogenesis, and ketosis). It is also associated with alterations in mucopolysaccharide metabolism affecting the blood vessels, eyes, kidneys and nerves, and these changes are at present poorly understood.

'Thiols'

These are chemical substances which have an alcoholic configuration, but in which the oxygen of the alcoholic grouping is replaced by sulphur, e.g. R-OH = alcohol structure, R-SH = thiol structure; CH₃.OH = methyl alcohol, R-SH = mono-thiol; and CH₃.CH₂.OH = ethyl alcohol, R.SH.SH = di-thiol.

The example of a mono-thiol with which we are most familiar in medicine is methyl mercaptan. This is one of the substances which is present in the urine and the breath of a patient with hepatic failure (CH₃.SH), and which gives

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the characteristic asparagus-like smell. Other thiols are co-enzyme A (CoA-SH) and glutathione. An example of a dithiol is 2, 3-dimercapto-propanol, best known as 'BAL' (British Anti-lewisite), and this is a dithiol derivative of propionic acid.

Thiol substances are often referred to as mercaptans because of their ability to combine with mercury ('capture mercury'),¹ and this is the basis of the use of BAL in mercury and heavy-metal poisoning.²

The fact that thiol groups are oxidizable and will combine with heavy metals has been known for many years, and Ehrlich, in 1909, actually suggested that this was the reason for the biological action of arsenic, mercury and their compounds. Later work with trypanosomes and spirochaetes showed that thiol compounds, especially glutathione and the sulphur-containing amino acid, cysteine, protected these organisms against the action of bismuth, arsenic and mercury. It has been suggested that mercurial diuretics produce their action on the kidney by combining with the SH groups present in the enzymes of the tubules, thereby impairing their function and causing diuresis. In the same way, lewisite, which is an arsenical poison, acts by blocking the pyruvate-oxidase enzyme system, which depends on thiamine in a protein-magnesium-cocarboxylase complex, and which is one of the important enzyme systems in carbohydrate metabolism. BAL, in arsenical poisoning, provides sulphhydryl groups which reactivate the 'poisoned' enzyme-SH groups.

SIMPLE CHEMISTRY

There are 8 essential amino acids (leucine, isoleucine, lysine, methionine, phenylalanine, threonine, tryptophane and valine),³ and only one of these, methionine, contains sulphur. Two other amino acids which contain sulphur are cysteine, and its condensation product, cystine.

Proteins are formed by the chemical combination of amino acids by peptide linkages, and glutathione is a tripeptide formed from glutamic acid, cysteine and glycine. Gowland Hopkins of Cambridge first identified this substance in the blood and tissues in 1921, and its function was for many years unknown. Glutathione is a sulphur-containing compound, in which the SH group is free. It has been found that the presence of free SH groups is of great importance in enzyme reactions which catalyze oxidation and reduction reactions, and 2 SH groups may combine with loss of 2 hydrogen atoms to form an oxidized, or disulphide linkage:



The disulphide linkage is of great importance in the insulin molecule. Sanger and his co-workers at Cambridge (1945-55) established the structure of insulin, and the molecule, which has a molecular weight of 6,000, contains 51 amino acids, of which 12% (6 units) are cysteine. In spite of our having known insulin as a pure crystalline protein since 1926 (Abel), at present we still do not know whether or not it has a single point of action, whether it acts at different points of carbohydrate metabolism,⁴ or whether it acts purely on the cell membrane by a physical process.⁴ In 1935 and 1937, Freudenberg and Wegman,⁵ and Stern and White,⁶ respectively, established that the disulphide bridges between the cysteine components of the molecule are important, and that their integrity is essential for in-

sulin activity.⁷ In 1947, Barron⁸ showed that BAL could inactivate insulin *in vitro* by breaching the disulphide bridges.

GLUTATHIONE

Glutathione is formed in the wall of the intestine and in the liver, and is transported within the erythrocytes to the various cells of the body. Very little is known about its transfer across the cell membranes or its place in normal physiology. Racker⁹ summarized the position in the 'euphoristic theory'. This states that glutathione is present to 'keep the cell enzymes happy' by preventing their oxidation, and protecting them against toxic heavy metals. Calvin¹⁰ stated that glutathione may be present in many different forms, and mentioned 7 different possible chemical configurations.

Glutathione is important in transpeptidation, oxidation-reduction and hydration-dehydration reactions. Hopkins established that it is the co-enzyme in the conversion of methylglyoxal to lactic acid. It is part of the co-enzyme in the oxidation of pyruvic acid (acetyl CoA-SH of the pyruvic-oxidase system), and is also essential in maintaining ascorbic acid in the reduced form in both animals and leafy vegetables, where its concentration parallels that of ascorbic acid. Living tissues maintain glutathione in its reduced form by means of triphosphopyridine-nucleotide (TPN) reducing systems and glutathione reductase.¹¹ Old erythrocytes which undergo haemolysis in certain forms of acquired haemolytic anaemia associated with glucose-6-phosphate dehydrogenase deficiency, e.g. favism; primaquine sensitivity; aspirin, sulphonamide, and phenacetin sensitivity, etc., have recently been shown to be deficient in glutathione. In sickle-cell anaemia, reducing substances, such as glutathione, cysteine, and bisulphite, as well as deoxygenation, cause sickling. Cortisone, which reduces the blood-glutathione level, has therefore been suggested as a form of therapy by Mazzia,¹² but it is not always successful.

Glutathione is formed in the presence of magnesium ions and adenosine triphosphate (ATP), firstly, by γ -peptide linkage of glutamic acid and cysteine to form glutamyl-cysteine; subsequently, glycine is added, also by peptide linkage. In the blood, small quantities of reduced glutathione are present (40 mg. per 100 ml.), as well as small amounts of glutamyl-cysteine and cysteinyl-glycine. Production of glutathione is limited by deficiency of the amino acid, serine (β -hydroxyl-glycine), cysteine and glutamic acid.¹³

Deficiency of vitamin B₁₂, folic acid, and pyridoxine also limit glutathione production. (Vitamin-B₁₂ function is related to nucleic-acid synthesis, transmethylation, maintenance of SH forms of S-S compounds, and function of liver enzymes, and has a key rôle in protein synthesis; pyridoxine is important in decarboxylation reactions.) In animals, vitamin-B₁₂ deficiency has been shown to cause decreased carbohydrate and fat metabolism, manifest as hyperglycaemia and an impaired glucose-tolerance test,^{15, 61} but it has no effect on steroid-induced diabetes. As a point of interest, diabetic retinopathy and neuropathy have been treated with varying, but limited, success with vitamin B₁₂,¹⁴ and pyridoxine. More recently anabolic steroids have been used. All of these are important in glutathione

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synthesis, and synthesis of glutathione may be the result of therapy and a possible cause of benefit.

Henneman *et al.*¹⁷ have shown that blood-glutathione levels are (a) decreased in anaemia, ketosis, liver disease and obstructive jaundice, beri-beri, and sanguinarine intoxication; (b) normal in diabetes and after steroid administration; and (c) increased in febrile disorders (not a result of increased metabolic rate). Lazarow¹⁸ has shown that the blood level of glutathione is decreased in sodium deficiency, cysteine and methionine deficiency, ketoacidosis caused by acetoacetate injections, and scurvy.

In beri-beri, which is due to thiamine deficiency, there is hyperpyruvicaemia. In India, a form of epidemic oedema has been found to occur as a result of ingestion of argemone oil, which contains an alkaloid, sanguinarine, and which depletes the blood glutathione. Here, too, hyperpyruvicaemia results. The 2 conditions are therefore similar, the major difference being that the one is due to a deficiency of the constituent of the enzyme (cocarboxylase), while the other is due to a deficiency of the co-enzyme (the glutathione component of the acetyl co-enzyme A).

SOME ASPECTS OF DIABETES

Hsia¹⁹ classified diabetes as one of the diseases caused by an inborn error of metabolism. Approximately 60% of patients give a family history of diabetes,²⁰ and Pincus and White²¹ have demonstrated that this is the result of an autosomal genetic transmission.²² There are apparently both dominant and recessive genes, and penetrance may be related to age, parity, weight and ABO blood groups. A homozygous pattern is said to result in earlier emergence of the condition than a heterozygous pattern.

$Dd \times Dd = 25\% \text{ homozygous } dd$, $Dd \times dd = 50\% \text{ dd}$, and $dd \times dd = 100\% \text{ dd}$. The dd pattern is an autosomal recessive combination and produces diabetes with a variable age of onset.

Joslin²⁰ has expressed the opinion that all patients with true diabetes have a hereditary background, and that the latent or incubation period of the disease may vary greatly and extend up to 60 years. The incidence of diabetes increases with age,^{23,24} owing to metabolic and environmental factors acting on inherited susceptibilities to these factors.²⁵ A possible acquired factor is multiparity in the female.^{20,26}

It would appear that there are 4 factors which may be responsible for the emergence of diabetes:

1. Congenital aplasia or hypoplasia of islet cells.
2. Islet exhaustion following prolonged carbohydrate load.
3. Islet-cell intoxication (diabetogens).
4. Anti-insulin substances — (i) endocrine gland secretions, or (ii) antibodies, endocrine dependent.

The possibility of endocrine-dependent antibodies in the pathogenesis of diabetes has recently assumed importance as a result of the work of Vallance-Owen,^{27,28} and may be associated with the β -lipoproteins, albumin, and α -globulin and γ -globulin fractions of the plasma. Rizzo *et al.*²⁹ have shown that obese non-insulin-dependent diabetic subjects have high levels of anti-insulin factors in their blood in association with high blood-sugar levels.

In diabetes, we cannot consider the rôle of the pancreas and insulin alone and, although it is customary, it is not necessarily correct to control diabetes according to demonstrable abnormalities in carbohydrate metabolism.⁴ True complete pancreatic deficiency is mainly a result of surgical procedures, and it differs from other clinical forms of diabetes in that it usually requires only 30-40 units of insulin a day for 'control'. In diabetes, pancreatectomy has been shown to reduce the daily requirement of insulin, and this is thought to be the result of removal of glucagon-secreting α -cells.

CLASSIFICATION OF DIABETES

There are many different clinical classifications of diabetes and this has led to confusion. Recently, Gillman *et al.*³⁰ and Gilbert *et al.*³¹ have studied experimental diabetes in baboons along the classical extirpation and substitution lines of von Bering and Minkowski, Houssay, and Young. Based on this work, and experience at the Diabetic Clinic of King Edward VIII Hospital, it is suggested that diabetes

TABLE I. COMPARISON OF KETOTIC AND NON-KETOTIC DIABETES

	Ketotic	Non-ketotic
Onset	Young	Maturity
Body habitus	Tall, thin	Short, obese
Insulin	Dependent	Independent
Insulin levels	Often deficient ⁴	Normal ^{5,6}
Insulin resistance	+++	++
Insulin antibodies	α -globulin, albumin	β -lipoproteins
Hormones	STH (Ant. pituitary)	Adrenal (11, 17 oxysteroids)
	+++	+++
Lipaemia	Absent	Present
Complications	Keto-acidosis	Vascular, especially retina
Oral therapy	Poor response	Good response
Glutathione	Decreased	Normal or slight decrease
Types	... I (Hugh Jones) 'Insulin dependent' (Himsworth) II 'Insulin dependent' (Lawrence)	... 'insulin independent' 'Lipoplethoric'

be classified as *ketotic* and *non-ketotic*, which corresponds roughly with *insulin dependent* and *non-insulin dependent*, as shown in Table I.

EXPERIMENTAL AND CLINICAL DIABETES

There is evidence of a possible functional defect of islet cells in all diabetics, possibly caused by anti-insulin factors.³²

Experimentally, diabetes may be produced in many ways, among which are:

1. Pancreatectomy, removing at least 80% of the organ.
2. Partial pancreatectomy plus dietary modifications.
3. Diabetogens, especially alloxan.
4. Hormones and enzymes — glucagon, ACTH and steroids, STH (growth hormone), thyroxin, adrenaline, seminoma and interstitial-cell tumour of the testicle, and insulinase.

Lazarow³⁵ has summarized the above tabulation, by stating that anything which produces an increased rate of insulin removal, inactivation or destruction, would tend to lead to the development of diabetes.

Allen and Sherrill³³ demonstrated that high calorie diets produced β -cell changes in partially pancreatectomized

animals, and Dohan and Lukens³⁴ showed that hyperglycaemia in rats led to the development of a diabetic state. Houssay and Martinez³⁵ made the following interesting observations on the effect of diet on the development of diabetes in partially pancreatectomized animals:

A high-fat diet causes 100% diabetes;
A high-carbohydrate diet causes 78% diabetes (later 100%);

A high-protein diet causes 56% diabetes (later 82%).

In these experiments, the incidence of diabetes was independent of the calorie intake, but if the animals were given a high calorie diet as well, the onset of diabetes was more rapid. These observations accord with the clinical experience of 2 world wars in Europe, where with food rationing the incidence and mortality from diabetes fell. An interesting aspect of Houssay and Martinez' work is the fact that they have demonstrated experimentally that *single* daily feeds are more apt to produce hyperglycaemia than the same intake of food given in multiple feeds. This may be of importance clinically, and we should perhaps ensure that our obese patients on reducing diets should not starve themselves during the day and then insult their homeostatic mechanisms with only one big meal a day. Joslin³⁶ has shown that obesity tends to increase with age, and that even slight weight reduction by obese diabetics leads to amelioration of the diabetic state and increased longevity. He advises particularly against obesity in pregnancy in Jewish females.

Pancreatectomy of at least 80% of the pancreas leads to the development of diabetes unless supplementary insulin is given. This has given rise to the concept that exhaustion of the remaining β -cells may be an important factor in diabetogenesis. Jackson and Woolf³⁶ have shown that the infants of prediabetic or diabetic mothers are generally large babies, and in these infants the islets of Langerhans show gross proliferation, becoming 'continents'. This may be the result of a response to raised blood-sugar levels, and/or other endocrine stimuli, among which Gilbert³⁷ has suggested the anterior pituitary growth hormone. One of the actions of the sulphonylurea compounds which are used in oral diabetotherapy, is to cause stimulation and proliferation of the islet β -cells, and the fact that these compounds are only of use in the presence of an endogenous supply of insulin suggests some basis for the exhaustion theory (these compounds also inhibit insulinase³⁸).

Another observation which supports the exhaustion theory is that phlorizin prevents hyperglycaemia from causing degranulation, hydropic degeneration, disappearance and fibrosis of the β -cells. The action of the biguanides is at present incompletely understood. Pomeranz *et al.*³⁹ have suggested that they cause transient tissue hypoxia, leading to anaerobic glycolysis and formation of lactic acid, but their action is possibly similar to that of synthalins A, which causes degeneration of α -cells and consequent decrease of glucagon production.⁴⁰ Another hypoglycaemic substance is hypoglycin, found in Jamaican ackee fruit. Hypoglycin B is the glutamic-acid amide of hypoglycin A, and has a simple amino-acid structure. In view of its glutamine content, it may have some action by way of glutathione metabolism and synthesis.

DIABETOGENS

The possibility of diabetogenic substances has been postulated for many years.⁴¹ In 1889, Weiner⁴² showed that alloxan could produce death from convulsions in rabbits, and Jacobs⁴³ demonstrated that these were caused by hypoglycaemia. Provided the initial hypoglycaemia is treated, a permanent diabetic state develops about 17 days after the injection of alloxan.¹⁸

Alloxan is a chemical substance with a very short life in the blood; it is a pyrimidine compound related to the nucleic-acid derivatives thymine and cytosine, to uracil, and also to the barbiturates. Everett⁴⁴ stated that alloxan is an oxidation product of uric acid, and Lazarow²⁵ suggested that uric acid or one of its metabolites may be diabetogenic.

Uric acid has been shown to be capable of producing diabetes permanently under experimental conditions (1 G. per kg. body weight by intravenous injection), and Griffiths⁴⁵ was able to produce a diabetic state in protein-deficient rats by intraperitoneal injection of uric acid. Diets containing vegetable fats and protein protect against the diabetogenic action of alloxan. Methionine is also protective, whereas choline is not, and this is thought to be due to the SH groups in methionine.

Many enzymes contain SH groups which may be decreased by oxidants such as alloxan and dehydroascorbic acid, heavy metals, and protein deficiency. It has been shown that injection of alloxan results in the alloxan combining with erythrocyte glutathione to form dialuric acid and an unidentified substance with an absorption maximum in the spectrum at 305 Angstrom units. Heavy metals do not produce diabetes, because in combining with SH groups they act as enzyme poisons. Glutathione, like BAL, can reactivate disulphide linkages, and so protect them against the action of heavy metals such as mercury and arsenic. Both glutathione and BAL also protect against the diabetogenic action of alloxan provided they are given before the alloxan.⁴⁵ Because alloxan can combine with amino (-NH₂) groups as well as with sulphhydryl groups, it is a more effective diabetogen, although it is also toxic in its action on enzymes. In the doses used, alloxan selectively affects the β -cells, which have a low glutathione content, and are therefore more susceptible to its action in low concentrations. When alloxan is injected intravenously it combines with the blood glutathione and is neutralized by it, causing a decrease in the blood-glutathione level as well as in the amount of effective circulating alloxan.

The action of alloxan is potentiated by factors which reduce the blood-glutathione level, e.g. protein deficiency and starvation;⁴¹ increased dehydroascorbic acid in scurvy;⁴⁶ and raised blood-uric-acid levels — possible diabetogenic substances.⁴⁷

Normally, insulin is destroyed by insulinase, and this process is decreased by hypophysectomy and thyroidectomy. *In vitro*, glutathione inactivates insulin (by opening the disulphide bridges), but Lazarow¹⁸ mentioned that the use of antithyroid substances and thyroidectomy caused an increase in the tissue glutathione content, and protected against alloxan diabetes. Injection of anterior pituitary extracts causes a decrease in tissue glutathione and the

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occurrence of diabetes, which may be permanent.^{48,49} Insulin has been found to raise the tissue-glutathione level. In human diabetics, the blood level of glutathione may be normal in non-ketotic patients, or decreased if ketosis is present (acetooacetate increase and sodium depletion).

It has been suggested that reduction of the β -cell glutathione level may make the β -cell enzymes more susceptible to the action of diabetogens or toxins, especially when insulin demands are increased, as in hyperpituitarism, hyperthyroidism and hyperglycaemia. Conn *et al.*⁵⁰ have shown that ACTH causes an increase in uric-acid excretion, decreased tissue-glutathione levels, and decreased glucose tolerance. Herman⁵¹ has reported decreased glucose tolerance in patients with gout. Uric acid may form dialluric acid in the liver, and this may be oxidized to alloxan, but it is not known if alloxan is an intermediate substance in the metabolism of uracil and cytosine in the formation of urea and ammonia.

CLINICAL DATA

Much of the work on glutathione is not conclusively established, mainly owing to poor techniques, and, as a result, the alterations in glutathione levels in various clinical conditions are not proved beyond doubt. Joiner⁵² stated that blood-glutathione levels were unaltered by ACTH given to non-diabetic subjects, although 4 of his 11 patients developed lag-type glucose-tolerance curves. He concluded that the administration of ACTH did not cause diabetes by virtue of an alloxan-like action in the presence of decreased glutathione levels. Seltzer⁵³ estimated the blood-glutathione levels in diabetics, and found that they were lower than in controls both before and after administration of tolbutamide, but his results do not relate blood-glutathione levels to the erythrocyte levels. Other workers have not produced consistent results for blood-glutathione levels in diabetics, and this may be the result of poor selection of cases without due regard to the type of diabetes being investigated. Krahl⁵⁴ showed that, in diabetes, the liver production of glutathione is decreased, and that this is improved by adding both insulin and glucose, whereas insulin alone has no effect.

Administration of glutathione to normal persons has been found to cause an increased peripheral use of glucose that does not result from insulin potentiation or inhibition of adrenal steroid action.⁵⁵ In vivo, glutathione stimulates the secretion of adrenal steroids, whereas in vitro it decreases their secretion. In steroid diabetes, administration of glutathione produces inconsistent results. In rats, glutathione increases the hyperglycaemia of steroid diabetes, whereas it reduces the hyperglycaemia of Cushing's syndrome, in which glutathione levels are low. Steroid administration causes a decrease in the blood-glutathione level, and if the glucose-tolerance test is abnormal, the decrease in the blood-glutathione level coincides with the maximal rise in the blood-sugar level. Large doses of steroids and ACTH cause ketosis and insulin resistance, and may contribute to the lowered blood-glutathione levels by this mechanism. It is still not known whether or not diabetes mellitus and steroid diabetes are caused by similar metabolic changes.

In clinical practice, Bailey⁵⁶ has shown that about 10% of patients with severe burns exhibit signs of adrenal

overactivity manifest as glycosuria, hyperglycaemia and eosinopenia. Conn⁵⁶ showed that intravenous injection of glutathione lowered the blood-sugar level in ACTH diabetes, and that by giving BAL to burn cases, the hyperglycaemia and hyperpyruvicaemia which were present were reduced. Butterfield⁵⁷ has given BAL to insulin-resistant diabetics (2 obese females), with subsequent decrease in their carbohydrate excretion. He has also shown that BAL administration benefits the control of brittle diabetics who have a hyperpyruvataemia, but this is of limited value because of the long-term dangers of BAL administration. β -Mercaptoethylamine has been given orally with inconsistent results (this is a component of co-enzyme A). The basis of these clinical experiments is the supply of sulphhydryl groups to the body.

The whole position regarding alloxan has been summarized by Lazarow.¹⁸ Glutathione protects against alloxan, and the level of glutathione in the blood and the β -cells determines sensitivity to alloxan. It is probable that the β -cell-glutathione level is an important factor in determining the age and speed of onset and the progression of diabetes in animals with decreased pancreatic reserve, but there is no direct evidence of this. It is not known whether or not tissue-glutathione levels are the result of hormone action or the metabolic disturbances caused by hormonal imbalance. The only established facts are that alloxan destroys β -cells, that alloxan reacts with glutathione, that glutathione protects against the effects of alloxan, and that factors which increase tissue-glutathione levels cause a decreased sensitivity to alloxan, and vice versa.

SUMMARY

The reasons for the emergence of diabetes in man are at present incompletely understood. It would appear that diabetes mellitus is an inborn error of metabolism that becomes manifest as the result of metabolic and environmental factors acting on inherited susceptibilities to these factors. The rôle of diabetogens in human diabetes is at present unsettled.

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THE ROLE OF THE GENERAL PRACTITIONER IN THE EARLY DETECTION OF CHRONIC SIMPLE GLAUCOMA

M. H. LUNTZ, *Ophthalmologist, Cape Town*

It is not, in my experience, generally recognized among the body of general practitioners that 3-4% of people over the age of 45 years suffer from a potentially blinding disease. These patients have no eye symptoms or signs apart from a raised intraocular pressure. They have early chronic simple glaucoma with, as yet, none of the sequelae, e.g. cupping and later atrophy of the optic disc, field loss and eventual blindness. Detection and treatment at this early stage is an ideal that all should strive for, but which is rarely attained. This can only be done by routine tonometry (measurement of the intraocular pressure) of all patients in this age group.

Mass screening surveys, by means of tonometry, for the detection of glaucoma, were first carried out in the USA and the results of these are of interest. They also confirm what has been stated in the previous paragraph. I will discuss some of these results, together with similar observations from my private practice.

MASS SURVEYS FOR GLAUCOMA

One of the earliest of these was conducted in 1958 at the outpatient clinics of the University of Tennessee School of Medicine.¹ Routine tonometries with subsequent provocative tests, where indicated, were performed on 1,120 patients without eye symptoms or signs. Of these, 313

persons with elevated tensions were discovered. With further tests 49, or 4% of the total, were proved to have glaucoma.

These results have been confirmed by other mass screening projects in a city-wide survey in Cleveland,² and a 10-day survey at the San Diego Country Fair, Del Mar, California³ where 3,986 persons were tested at random. In these surveys the incidence of proved glaucoma in the absence of ocular symptoms or visible signs varied between 3 and 4%.

A review of patients from my own private practice has confirmed these figures, although the numbers involved are naturally much smaller. It is my practice to perform routine tonometries on all patients over 45 years of age. During the year March 1960 - February 1961, inclusive, 140 patients were subjected to this test. These were all patients in whom the ocular examination, apart from tonometry, was regarded as normal. Of these, 9 were found to have a raised tension. These were investigated, and 4 of them, or 3% of the total, were proved to have early chronic simple glaucoma. The criterion for this diagnosis was the presence of ocular hypertension (i.e. a tension of more than 25 mm.Hg on the 1955 scale) and at least 2 positive provocative tests out of 3 (tonography; water-

TABLE I. FINDINGS IN 4 PATIENTS WITH CHRONIC SIMPLE GLAUCOMA

Patient	Age (years)	Corrected vision	Tension (applanation tonometry)	Fields	Angle	Tonography	Water-drinking test	Po/cf
1. Mr. M. . .	70	R = 6/6 L = 6/6	R = 24 L = 19	Normal	Broad and open in both eyes	R = 0.08 L = 0.08	R = - ve L = - ve	> 100
2. Mrs. L. . .	62	R = 6/6 L = 6/6	R = 24 L = 24	Normal	Medium open in both eyes	R = 0.13 L = 0.08	R = - ve L = - ve	> 100
3. Mrs. B. . .	70	R = 6/9 L = 6/6	R = 30 L = 20	Right arcuate scotoma	Broad and open in both eyes	R = 0.17 L = 0.22	R = + ve L = + ve	> 100
4. Mrs. M. . .	61	R = 6/6 L = 6/6	R = 24 L = 21	Normal	Broad and open in both eyes	R = 0.35 L = 0.08	R = + ve L = - ve	> 100

drinking test; and tonography after water, where $Po/cf = > 100$ —see Table I.

One patient showed an early arcuate scotoma in one eye; in the remainder the fields were normal.

DISCUSSION

General practitioners are well aware of the importance of primary glaucoma as a cause of blindness, and this point need hardly be stressed. Some 9% of total blindness is due to this disease.⁴ They know that it may present as either an acute or chronic disease. The acute attack is easy to recognize, and occurs early in the clinical course of the disorder, so that the institution of prompt treatment and adequate follow-up will prevent the occurrence of sequelae from a persistently raised intraocular pressure.

This is termed acute closed-angle glaucoma, because the rise in tension is a consequence of mechanical closure of the anterior chamber angle (filtration angle), occurring when the iris is pushed up against the back of the cornea. This blocks the angle, resulting in acute embarrassment to aqueous drainage.

Chronic Simple Glaucoma

The picture is quite different, however, in the patient with primary chronic glaucoma (chronic simple glaucoma). In this condition the rise in ocular tension is insidious, maintained over a long period of time, and symptomless. The initial feature is ocular hypertension, occurring at first intermittently and mainly in the mornings, later becoming chronically raised (*cf.* essential hypertension).

The condition is not as a rule diagnosed during this phase of the disease, and it is only later, when sequelae manifest themselves, that the patients are recognized as having glaucoma. These sequelae are cupping and later atrophy of the optic discs with field loss. Progressive atrophy and field loss lead to ultimate blindness. It is important to realize that the visual acuity remains normal until the very late stages.

This clinical picture is well known to undergraduates and practitioners. What is not so well recognized, in my experience at any rate, is that these sequelae are present only in the very late stages of the disease. It has been estimated that a persistently raised intraocular tension must be present for over 15 years before cupping of the optic disc appears.⁵

Once this has set in it cannot be reversed in the present state of our knowledge; thus the patient is left with a permanent field loss. The best that can be hoped for is that, with adequate control of the tension, further deterioration will be prevented.

The obvious question that springs to mind is: could these incurable sequelae not be prevented by early diagnosis and prompt treatment? The answer is not yet fully known. While it is generally accepted that cupping of the disc is an inevitable consequence of prolonged ocular hypertension acting mechanically on the nerve head, we are not yet sure whether arteriosclerotic ischaemia contributes to this and, if so, by how much.⁶ Nevertheless,

it is a clinical fact that cupping is rare in the absence of raised ocular tension and that its early control will prevent this in most cases. This is the ideal and can be attained only if all patients over 45 years of age have their intraocular pressure checked regularly and as a routine. The disease is rare before this age.

Testing Intraocular Pressure

It is here that the general practitioner plays a vital part. Most people are content to have 'eye tests' done by medically unqualified personnel. These are not ocular examinations, but merely refractions, and here again I stress the point that visual acuity remains normal or nearly normal until the disease is far advanced. The visual fields, on the other hand, are affected at an earlier stage. The family doctor, therefore, responsible as he is for the general health of his patients, must include in this context their ocular health. I feel that tonometry should be included as part of his routine examination of those of his patients who fall into the relevant age group. There are 2 methods of assessing ocular tension:

1. *Digital palpation:* Although this has limited use in skilled hands, it is too inaccurate to be of general value.

2. *Tonometry:* This is an easily mastered technique and the instrument used is not costly. Undergraduates are taught its use during their attendance at ophthalmology outpatient departments, but I feel that often the importance of its routine use is not adequately stressed. I would also venture to suggest that arrangements should be made to demonstrate the technique at postgraduate refresher courses, together with a clear account of its value.

Having established that a patient has a raised (i.e. greater than 25 mm.Hg on the 1955 Friedenwald scale) or borderline tension (greater than 21 mm.Hg), further investigations are required. These require the services of an ophthalmologist, who will then have to decide whether this is a true case of glaucoma or not. This is done by measuring the unit outflow of the aqueous humour from the anterior chamber, under normal and provoked conditions (provocative tests). In glaucoma the outflow is reduced.

SUMMARY

The reported incidence of symptomless early chronic simple glaucoma in the general population is confirmed. A plea is made for the more active participation of the family doctor in the recognition of this disorder, thereby avoiding late complications. This can best be achieved by routine tonometry (measurement of the intraocular pressure) as part of the general examination of all patients over 45 years of age.

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UNUSUAL BEHAVIOUR OF FROG AND HUMAN SERUM PROTEINS LOADED WITH ^{131}I -LABELLED THYROID HORMONES DURING PAPER ELECTROPHORESIS

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It has been reported earlier that the serum protein-bound iodine in the South African toad (*Xenopus laevis*) is higher than that of most animals.¹ Since it is thought that the serum proteins to which thyroid hormones are bound, determine to some extent the speed with which the hormones enter the cells,² a greater affinity of the specific binding proteins for thyroid hormones or a slower turnover rate of the binding proteins in cold-blooded animals could explain in part the relatively high serum protein-bound iodine and, therefore, the decreased metabolic rate in the frog.

During studies on the binding properties of serum proteins with ^{131}I -labelled thyroid hormones, the association of ^{131}I -labelled tri-iodothyronine ($^{131}\text{T}_3$) and thyroxine ($^{131}\text{T}_4$) with the proteins of frog serum was compared with that of human serum. The specific binding proteins, in most cases, were overloaded with $^{131}\text{T}_3$ and $^{131}\text{T}_4$. The hormones were labelled with ^{131}I chemically by exchange³ and also endogenously by injecting 200 μg of ^{131}I into a mouse. After 48 hours the thyroid was digested enzymically. The hydrolysate was chromatographed, radio-autographed, and the radioactive bands corresponding to tri-iodothyronine and thyroxine markers were eluted (Fig. 1*). The ^{131}I -labelled thyroid hormones were added *in vitro* to serum and electrophoresed on paper in barbiturate-acetate buffer at pH 8.6.

The electrophoresed frog serum, unlike human serum, gave only 3 distinct bands on the anode side of the origin (Fig. 2). The albumin band of frog serum shows a greater electrophoretic mobility than that of human serum. Midway between the albumin and the origin, a broad band appeared in frog serum which corresponded to the area between the α_1 and the α_2 globulin of human serum. This protein band is referred to as the β -globulin, although it may not necessarily be the same as β -globulin of human serum. In some cases the γ -globulin is fairly well defined, but in most cases it is just visible when 20 μl . of frog serum is used.

The radioactivity from endogenously prepared $^{131}\text{T}_4$ added to serum was associated with both the inter-alpha globulins and albumin when human serum was used. On the other hand, in frog serum it was mainly associated with β -globulin and to a lesser extent with albumin (Fig. 3).

In order to gain some information about the binding capacity of frog and human serum proteins, chemically prepared $^{131}\text{T}_4$ was added in known concentrations to serum, and electrophoresed. At a concentration of 0.05 μg . $^{131}\text{T}_4$ /ml. of serum the bulk of radioactivity was again associated with the inter α -globulins in human serum and with the β -globulins in frog serum (Fig. 4). However, when the chemically prepared $^{131}\text{T}_4$ was increased to 0.5 μg . $^{131}\text{T}_4$ /ml. of serum, most of the radioactivity shifted onto the human serum albumin, whereas the albumin of frog

* Figs. 1-8 are on p. 1047.

serum had not taken up much $^{131}\text{T}_4$. In frog serum such high concentrations of $^{131}\text{T}_4$ were mainly associated with β -globulin and another radioactive peak appeared ahead of the albumin (Fig. 5).

When endogenously prepared $^{131}\text{T}_3$ was added to frog and human sera, an unusual electrophoretic migration of the radioactivity was noted. With human serum the major portion of the radioactivity moved during electrophoresis for a distance of about 5 cm. from the origin towards the cathode, while smaller portions were associated mainly with albumin and pre-albumin. With frog serum the major portion of the radioactivity was similarly located as an intense band about 5 cm. on the cathode side of the origin whereas the rest of the activity coincided with the positions of albumin and β -globulin (Fig. 6).

Staining of the electrophoretograms showed no protein bands corresponding to the ^{131}I -labelled substance which migrated towards the cathode. Electrophoresis of the same sera loaded with endogenously prepared $^{131}\text{T}_3$ was repeated and the same results were obtained.

In an attempt to identify the radioactive substance which migrated towards the cathode, the human and frog sera containing the endogenously prepared $^{131}\text{T}_3$ and $^{131}\text{T}_4$ were chromatographed one-dimensionally in butanol: dioxan: 2-N NH₂OH (4:1:5) with carriers T_3 and T_4 (Fig. 7). The darkened areas on the radio-autograph of the chromatogram indicated that the $^{131}\text{T}_4$ corresponded exactly with carrier T_4 in frog and human sera, but that the $^{131}\text{T}_3$ was slightly ahead of the carrier T_3 spots. The concentration of carrier T_3 was greater than that of carrier T_4 , and this may have caused the $^{131}\text{T}_3$ to move slightly ahead of carrier T_3 .

The section of the electrophoretogram corresponding to the ^{131}I -labelled substance, which migrated towards the cathode, was cut out, eluted, and the extract chromatographed two-dimensionally in butanol: dioxan: 2-N NH₂OH and in butanol: acetic acid: water (120:30:50). Most of the activity corresponded to non-radioactive T_3 and iodide (Fig. 8). Other carriers tested out, like 3-mono-iodothyronine, 3:3'-di-iodothyronine, and 3:5:3'-tri-iodothyroacetic acid, did not coincide in two-dimensional chromatograms with the radioactive spots.

It is concluded that (1) frog serum, unlike human serum, carries thyroxine on the β -globulins, (2) the binding capacity of the β -globulins of frog serum for thyroid hormones is greater than that of the inter- α -globulins of human serum, and (3) the bulk of the ^{131}I -labelled substance, which migrated towards the cathode during electrophoresis of frog and human sera under the conditions of the experiment, was in fact $^{131}\text{T}_3$.

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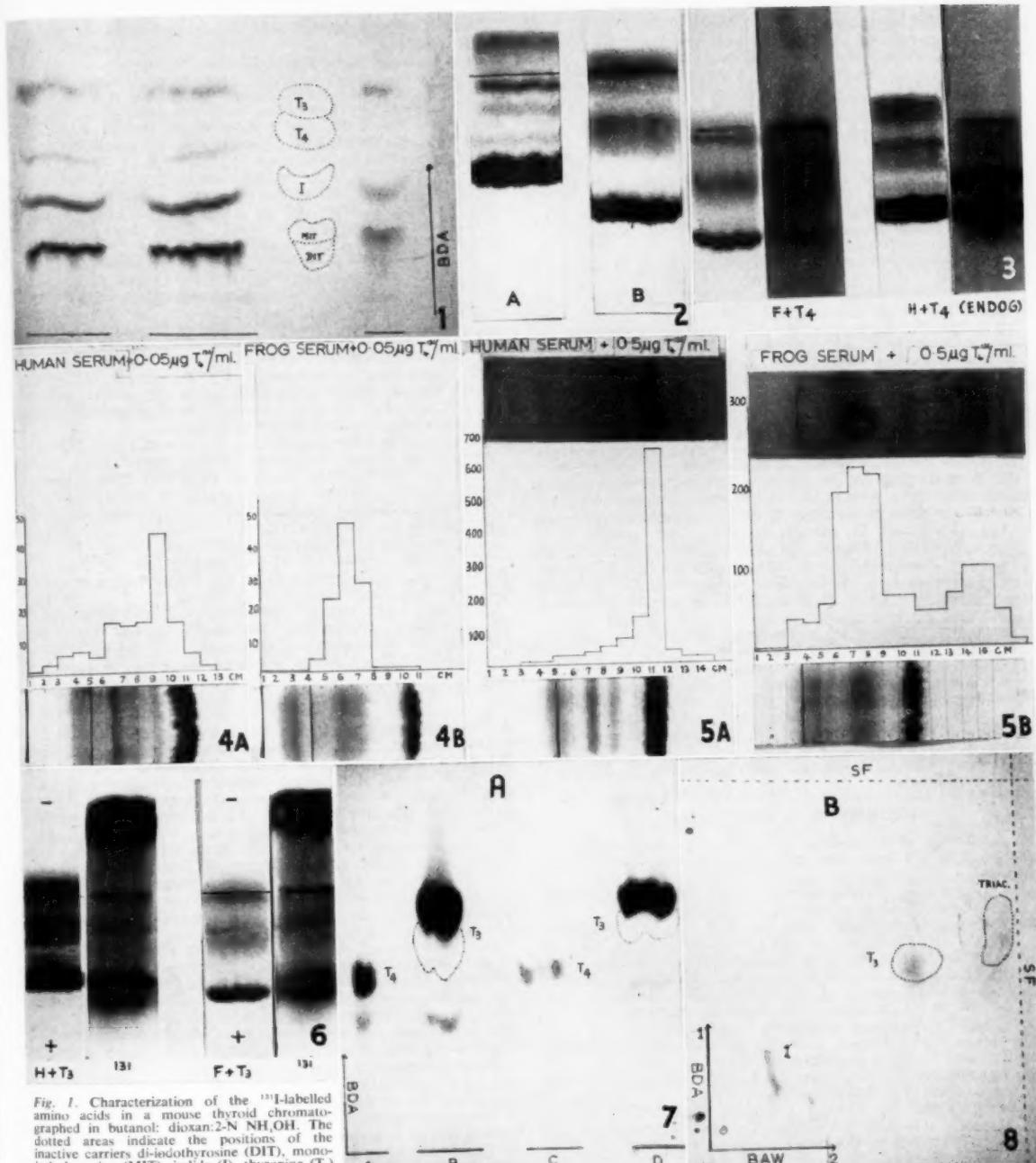
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Fig. 1. Characterization of the ^{131}I -labelled amino acids in a mouse thyroid chromatographed in butanol: dioxan:2-N NH_4OH . The dotted areas indicate the positions of the inactive carriers di-iodothyrosine (DIT), mono-iodothyrosine (MIT), iodide (I), thyroxine (T_4) and tri-iodothyronine (T_3).

Fig. 2. Stained electrophoretic patterns of (A) normal human serum, and (B) frog serum.

Fig. 3. The association of endogenously prepared $^{131}\text{T}_4$ with frog ($\text{F}+\text{T}_4$) and human ($\text{H}+\text{T}_4$) sera. The radio-autograms are shown to the right of the stained electrophoretograms in each case.

Fig. 4. The association of $0.5 \mu\text{g} \text{ }^{131}\text{T}_4/\text{ml}$. with (A) human serum, and (B) frog serum. The histograms represent the radioactive counts per cm.

length of the electrophoretograms.

Fig. 5. The association of $0.5 \mu\text{g} \text{ }^{131}\text{T}_4/\text{ml}$. with (A) human serum, and (B) frog serum. The radio-autogram (above) and the graph indicate qualitatively

and quantitatively the activity associated with the various protein fractions on the electrophoretogram below the graph.

Fig. 6. The association of endogenously prepared $^{131}\text{T}_4$ with human (H) and frog (F) serum proteins. The stained electrophoretogram is indicated on the left of each pair while the radio-autogram is on the right.

Fig. 7. Radio-autogram of chromatographic analyses of frog (A and B) and human (C and D) sera to which endogenously prepared $^{131}\text{T}_4$ and ^{131}I had been added.

Fig. 8. Characterization of the endogenously prepared radioactive substance which migrated to the cathode on electrophoresis, indicating the positions of non-radioactive carriers: iodide (I'), tri-iodothyronine (T_3) and tri-iodothyroacetic acid (TRIAC). Solvents: 1. Butanol: dioxan: 2-N NH_4OH (BDA).

2. Butanol: acetic acid: water (BAW).

MINUTES OF MEETING OF FEDERAL COUNCIL HELD IN CAPE TOWN ON 21, 22 AND 23 SEPTEMBER 1961

The following are the Minutes of a Meeting of the Federal Council of the Medical Association of South Africa, held in the Bacteriology Lecture Theatre, Medical School, Cape Town, on 21, 22 and 23 September 1961.

Present:

Ex Officio: Dr. W. Chapman (President of the Association), Dr. J. H. Struthers (Immediate Past Chairman), Mr. J. D. Joubert (Honorary Treasurer).

Border Coastal Branch: Drs. A. J. Puttick, H. M. Segall.

Cape Eastern Branch: Dr. J. W. Gehle.

Cape Midlands Branch: Drs. J. J. du Plessis, D. L. Ferguson, P. Jabkovitz.

Cape Western Branch: Mr. R. D. H. Baigrie, Dr. J. C. Coetzee, Mr. J. A. Currie, Drs. T. J. Dry, F. E. Hofmeyr, A. Landau, N. Levy, Mr. P. C. W. Madden, Drs. A. G. Paterson, J. H. L. Shapiro, A. W. S. Sichel, A. A. Zabow.

Eastern Transvaal Branch: Mr. D. E. Mackenzie, Drs. J. Q. Ochse, E. W. Turton.

Griqualand West Branch: Mr. N. Kretzmar.

Natal Coastal Branch: Drs. E. W. S. Deale, S. Disler, N. R. Pooler, N. A. Rossiter, N. G. Steere, A. B. Taylor.

Natal Inland Branch: Mr. B. A. Armitage, Dr. T. H. Whitsitt.

Northern Transvaal Branch: Dr. J. T. M. de Villiers, Prof. O. V. S. Kok, Drs. W. H. Lawrence, W. A. Lombard, P. N. Swanepoel.

O.F.S. and Basutoland Branch: Drs. J. Gilliland, R. Theron, G. F. C. Troskie, J. W. van der Riet.

O.F.S. Goldfields Branch: Dr. F. N. Gillwald.

Southern Transvaal Branch: Drs. C. Adler, A. L. Agranat, B. T. Bernstein, J. I. H. Frootko, R. Geerling, J. Gluckman, E. T. Meyer, H. I. Osler, H. Penn, F. W. Roberts, T. Schneider, S. Spiro.

South-West Africa Branch: Dr. H. J. Schmidt.

Soutpansberg Branch: Dr. I. S. Steyn.

Transkei Branch: Dr. E. R. Louw.

Vaal River Branch: Dr. C. G. S. van Heyningen.

Western Transvaal Branch: Drs. M. J. Meter, T. Radloff.

In Attendance: Drs. A. H. Tonkin (Secretary), L. M. Marchand (Associate Secretary), P. D. Combrink (Assistant Secretary).

Observers: Dr. A. P. Blignault (Editor), Dr. R. L. Kleinman (Assistant Editor).

THURSDAY, 21 SEPTEMBER

The Chairman of Council, Dr. E. W. Turton, declared the Meeting open at 9.45 a.m. and welcomed members to the Meeting.

1. *Notice Convening the Meeting*, which had been published in the *Journal* of 12 August 1961, was taken as read.

2. *Proxies and Apologies:* The Secretary announced Proxies as follows: Dr. Disler to act for Dr. A. Broemberg, Dr. du Plessis to act for Dr. P. de la H. Beck; Dr. Gluckman to act for Dr. M. Shapiro; Dr. Jabkovitz to act for Dr. A. P. Albert; Dr. Puttick to act for Dr. J. K. McCabe; Dr. Schmidt to act for Dr. W. H. G. Kuschke; Dr. Segall to act for Dr. L. L. Alexander; Dr. Steere to act for Dr. J. Duncan.

Apologies for absence from Drs. Alexander, McCabe, Schaffer and Slabbert were noted.

3. *Introduction of New Members:* The Chairman welcomed the representative of the Soutpansberg Branch (Dr. Steyn) and the members for the Western Transvaal Branch (Drs. Meter and Radloff). He also introduced Dr. Schmidt, representing the South-West Africa Branch. Dr. Ferguson introduced Drs. du Plessis and Jabkovitz.

4. *Minutes of Meeting held in Vereeniging on 19, 20 and 21 October 1960, and Special Meeting held in Johannesburg on 7 July 1961*, which had been circulated, were confirmed and signed.

HONOURS

5. *Association's Gold Medal:* The Secretary stated that he had received a sealed nomination and citation for the award

of the Association's Gold Medal. The name was announced and the citation read, and the Secretary stated that in accordance with the Rules the matter would remain confidential until the next meeting of Council, when it would be on the agenda for decision. *Noted.*

6. *Association's Silver Medal:* The Secretary stated that a recommendation, together with a citation, had been received that Prof. J. F. Brock of the University of Cape Town be awarded the Association's Silver Medal for distinguished service to medical science and humanity.

The citation was read and a ballot vote was taken. In due course the Chairman announced that as a result of the ballot, the Association's Silver Medal had been awarded to Professor Brock. *Acclamation.*

7. *Bronze Medals:* The Secretary drew attention to citations which had been circulated in respect of recommendations that Drs. A. B. Taylor, W. Waks, L. M. Marchand and E. W. Turton be awarded the Association's Bronze Medal for meritorious service. Ballot votes were taken and in due course it was announced that the Association's Bronze Medal had been awarded to the four nominees. *Acclamation.*

Council agreed that the Medals be presented at the Opening Ceremony of Congress. Council further agreed that citations be not read on that occasion with regard to the recipients of Bronze Medals, but that they be published in the *Journal*.

8. *Emeritus Membership:* Letters with citations were submitted from the Southern Transvaal Branch and the Western Transvaal Branch, recommending that Dr. James Black, of Johannesburg, and Dr. A. C. Schulenburg, of Potchefstroom, respectively, should be elected to Emeritus Membership of the Association. Council Resolved accordingly.

9. *Institute of Company Secretaries:* On behalf of Council, the Chairman congratulated the Secretary, Dr. Tonkin, on being elected as an Associate of the Institute of Company Secretaries of South Africa. *Acclamation.*

MATTERS ARISING OUT OF MINUTES OF MEETING HELD IN OCTOBER 1960

10. *Government Commission of Enquiry into High Costs of Medical Services and Medicines:* The Chairman reported on the meetings which the Executive Committee had had with the Commission, and added that it was expected that the Report would be ready by the end of January, when it would be tabled during the next session of Parliament. The Secretary drew attention to the fact that copies of the Report of the Gluckman Commission had been sent to each member of Federal Council and to each Branch of the Association.

It was proposed by Dr. Whitsitt, seconded by Dr. Gillwald and Resolved that a copy of the Commission's Report be sent to each member of Council and to each Branch of the Association.

11. *Treatment of Alcoholism:* A letter from the Chairman of the South African National Council on Alcoholism was submitted. The Secretary reported that the Executive Committee had agreed to recommend to Council, 'That the matter be referred to the Parliamentary Committee which should consult any authority it wishes and report to the next meeting of Council'. Council Resolved accordingly.

12. *Discrimination Against Indian Member:* The Chairman reminded Council that Dr. Frootko had been asked to make representations to the Professional Provident Society in respect of alleged discrimination against an Indian doctor who had applied for membership of the Society. Dr. Frootko stated that he had made known to the Society the attitude of Council, and that the Society had accepted the recommendation of Council, so that the situation had been amicably settled with the doctor concerned. Dr. Struthers asked that the assurance of the Society be obtained in writing.

Council Agreed to accept Dr. Frootko's report, and the Chairman expressed Council's thanks to him.

13. *Affiliated Student Membership:* A letter from the President of the Association of Medical Students of South Africa was submitted, in which was recorded the appreciation of that

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body for its affiliation to the Medical Association of South Africa. *Noted.*

14. *British Commonwealth Medical Conference and British Medical Association Annual Meeting, Auckland, February 1961:* A Report by the Secretary regarding these Meetings had been circulated, and the Secretary stated that he would be glad to answer any questions.

There were no questions, and the Report was *Noted.*

15. *Domicile Clause — Registration of Medical Practitioners:* Notice of motion had been received over the names of Mr. Baigrie and Mr. Currie, reading: "This Federal Council, being elected to foster the interests of the medical profession in South Africa as a whole, is of opinion that the concept of domicile should be removed from clauses of the Medical, Dental and Pharmacy Act which refer to the registration of medical practitioners by the South African Medical and Dental Council". In view of the satisfactory outcome of negotiations with regard to this matter, Council *Agreed* that Mr. Baigrie and Mr. Currie be allowed to withdraw this notice of motion.

Matters Arising out of the Minutes of Special Meeting held in July 1961

16. *Message to Secretary General of World Medical Association:* The reply to the letter of congratulation sent to Dr. Harry Gear, the newly-appointed Secretary General of the World Medical Association, was admitted and *Noted.*

REPORT OF THE EXECUTIVE COMMITTEE

17. *World Medical Association — 15th General Assembly, Rio de Janeiro, September 1961:* It was reported that Dr. R. Schaffer, Vice-Chairman of Council, had agreed to represent the Association at the General Assembly. The Chairman expressed the Council's thanks to Dr. Schaffer and stated that Dr. Schaffer had agreed to travel at his own expense. *Noted.*

18. *Visit of British Medical Association Officials:* It was reported that the Executive Committee had invited the Chairman of Council and the Secretary of the British Medical Association to visit South Africa. It was stated that they would arrive in time to attend the Congress in Cape Town, and that they would also visit other centres. Council *Agreed* that a meeting be arranged during Congress week, in order that Council members might have an opportunity of meeting the visitors and hearing their views.

19. *Shortage of Doctors:* It was reported that, in view of the apparently increasing shortage of doctors to occupy posts in hospitals, the Transvaal members of the Executive Committee had been appointed an *ad hoc* committee to consider this problem and its related problem of medical education. It was further stated that the Executive Committee recommended to Council that the *ad hoc* committee nominated by the Executive Committee be appointed as a Committee of Council and that it continue the work which it had begun. Council *Resolved* accordingly, and further *Agreed* that the Committee should decide on its own name and notify the Secretary accordingly.

20. *Association Subscriptions:* It was reported that the resignations of a number of full-time employed members were being investigated with a view to seeing whether it was not reasonable to adjust the Association subscription in their cases. The Chairman pointed out that 172 new members had joined the Association since the beginning of the year, but that the overall increase had been only 10 members. During the nine months under review, there had been 156 resignations, of whom 17 had re-joined. He remarked that most of the resignations had been by full-time employed medical personnel.

Prolonged discussion took place, during which several members made suggestions towards increasing the membership of the Association. Finally it was proposed by Dr. Struthers, seconded by Dr. Sichel and *Resolved Nem. Con.* "That the Head Office and Journal Committee give consideration to the question of membership of the Association and the problems involved, with particular reference to the amount of the subscription payable by different groups of members, and that it make recommendations to the Executive Committee which may assist in increasing the membership of the Association".

21. *Public Lectures at Congresses:* It was reported that a proposal had been made by the Organizing Committee of the

43rd South African Medical Congress that the Public Lecture to be delivered at the time of Congress be named. Two suggestions had been received. The Executive Committee had not reached agreement in this regard and wished Council to make a decision. After short discussion it was generally *Agreed* that the matter be referred to the Branches, in order that Council members might be apprised of the wishes of their Branches.

22. *Medical Services Plan:* It was reported that the Executive Committee had considered certain correspondence which had passed between a Branch of the Association and the General Manager of the Plan, and had agreed that the matter be raised at the next meeting of Council. It was generally *Agreed* that the matter be not discussed and that it be *Noted.*

23. *Letter in Journal — Protest by Chairman of Medical Services Plan:* It was reported that the Executive Committee had considered this protest and had seen no reason to interfere. The Committee sought confirmation by Council of its decision; but it was generally *Agreed* that this matter be not discussed but *Noted.*

24. *Insurance Patients — Resolution of Southern Transvaal Branch:* The Chairman read the resolution passed at a special meeting of the Branch, as follows:

- (a) That this Branch advises its members to treat all patients belonging to any insurance medical aid society scheme as private patients and not to grant Tariff rates to any person or member of a group insured by any commercial insurance company; and
- (b) that Federal Council be called upon to present the full facts to the members and to hold a referendum forthwith.

He outlined the events leading up to the calling of the Special Meeting of the Council in July, and pointed out that although Council members had replied against the holding of a Special Meeting by 39 votes to 14, a meeting had been requisitioned in terms of By-law 43.

After short discussion, Council *Agreed* that no Branch had the right to act on any resolution which was contrary to a decision of Council, according to By-law 46, and that in the circumstances the Southern Transvaal Branch could not act on the resolution which it had passed, and that the matter be *Noted.*

25. *Notice of Motion from Cape Western Branch — Costs of Federal Council:* It was reported that the Executive Committee had considered a notice of motion from the Cape Western Branch, reading:

- (1) at the first paragraph of By-law 34 (a) be amended to read:
- "Members of the Association elected by the respective Branches for three years calculated as laid down in present By-law 36 (b) after nomination by voting papers sent to all members of each Branch, in the proportion of one for the first 100 members of each Branch and one for each additional 200 members of the Branch or portion thereof, provided that such portion be 100 or greater."
- (2) That the Federal Council meet only once a year.
- (3) That all interim business of the Council be conducted by the Executive Committee in accordance with By-laws 54 and 55.
- (4) That if the Council considers it necessary to enlarge the Executive Committee for the purpose of (3) above, By-law 54 be amended accordingly."

In the discussion which followed, it was pointed out that the By-laws had recently been amended so that a saving in the Federal Council expenses should result.

Finally, on the matter being put to the vote, it was *Resolved* that the recommendation of the Cape Western Branch be rejected.

26. *Other Matters Dealt with by the Executive Committee:* The Chairman reminded members that there had been a number of other matters which had been dealt with by the Executive Committee and on which decisions had been taken. He asked that the actions of the Executive Committee in these matters be confirmed.

Council *Resolved Nem. Con.* that the actions of the Executive Committee be *Confirmed.*

REPORT OF THE EXECUTIVE COMMITTEE AUGMENTED FOR THE CAPE

27. *Chairmanship of Committee:* Dr. Sichel expressed uncertainty as to his right to present the Report, as no Chairman of the Committee had been appointed.

In the circumstances Council *Agreed* that Dr. Sichel be the Chairman of the Committee, and that he present the Report.

28. *Treatment at Provincial Hospitals of Inmates of Government Institutions:* It was reported that the position of inmates of Government institutions, as regards Government responsibility for medical care, had been clarified and accepted by the Committee. *Noted.*

29. *Revision of Basis of Honorarium Payable to Honorary Medical Staff:* It was reported that it had been agreed that this matter should be discussed further by an appointed sub-committee and be raised at the next meeting of the Liaison Committee.

The Chairman stated that the Executive Committee had considered this matter at its meeting on 19 September 1961 and had agreed to recommend to Council, 'That the method and rate of remuneration of medical practitioners in part-time hospital service in the Cape be the same as those applying in the Transvaal'. It was pointed out that this would do away with the 'honorary system', as it had been known, in the Cape, but that although medical practitioners were paid on a sessional basis in the Transvaal, they considered the amount of their payment as being virtually an honorarium.

After short discussion Council *Resolved Nem. Con.* that the recommendation of the Executive Committee be *Accepted.*

30. *Admission of Patients to Closed Hospitals:* It was reported that the Committee, after hearing the Director of Hospital Services state the policy of his Department, had agreed that no further action was necessary. *Noted.*

31. *Admission of Private Patients to the Open Beds at the Groot Schuur Hospital for Open-heart Surgery:* It was reported that the Committee had agreed that the open beds at the teaching hospitals should not be made available to private surgeons for open-heart operations on private paying patients. Council *Agreed.*

32. *Open Beds at the Karl Bremer Hospital:* It was reported that it had been agreed that a memorandum on this subject should be submitted to the Administration by the Cape Western Branch of the Association. *Noted.*

33. *Remuneration of White and Non-White Medical Officers in Hospitals:* It was reported that the Committee had recorded its protest at discrimination in salary scales, and that although it had been realized that this was a national and not a Provincial problem, it had been agreed that the protest should be recorded in the Minutes of the meeting. The Chairman stated that this matter would be dealt with further in the Report of the Parliamentary Committee.

Council *Agreed* that any discussion should take place at the time that the Parliamentary Committee's Report was received.

34. *Status and Remuneration of Heads of Departments of Anaesthetics:* It was reported that representations had been made to the Hospitals Department so that consultation with the University of Cape Town would take place. *Noted.*

35. *Training of Nurses at the Red Cross Children's Hospital:* It was reported that informal discussions on this subject were to take place between members of the Nursing Council, representatives of the Hospitals Department and representatives of the Red Cross Children's Hospital. *Noted.*

Dr. Sichel then proposed the adoption of his Report. Council *Agreed* accordingly.

Council adjourned for lunch from 12.55 p.m. to 2.30 p.m.

36. *Invitation from Cape Western Branch:* The Chairman announced that members of Council had been invited to a cocktail party to be given by the Cape Western Branch in the Students' Union at 6 p.m. *Noted.*

REPORT OF THE EXECUTIVE COMMITTEE AUGMENTED FOR NATAL

37. *'Farming-out' in Natal:* A verbal report was made by Mr. Armitage regarding conditions in the Natal hospitals, where it appeared that the Provincial Administration was charging fees and retaining them in the case of patients treated by medical personnel attached to the hospital staffs. A full

report was given on the proceedings which had taken place when representatives of the Augmented Executive Committee, together with the Chairman of Council and the Assistant Secretary, had met the Executive Committee of the Provincial Council.

After discussion it was *Agreed* that the next meeting of the Executive Committee of Federal Council would be held in Pietermaritzburg and that arrangements would be made at that time to interview the Executive Committee of the Provincial Council.

Mr. Armitage then proposed the adoption of his Report. Council *Agreed* accordingly.

REPORT OF THE EXECUTIVE COMMITTEE AUGMENTED FOR THE ORANGE FREE STATE

38. *Director of Hospital Services:* Dr. Theron reported that Dr. C. L. Brink had been appointed as the new Director of Hospital Services in the Orange Free State, and that a Committee of the Association had met Dr. Brink reasonably soon after his appointment, for discussions. *Noted.*

39. *The Treatment of Alcoholics in Hospital:* It was reported that there were no difficulties placed in the way of doctors who wished to treat alcoholics in hospital, but that the Ordinance did prohibit the admission of cases of delirium tremens. *Noted.*

40. *Meetings with Director of Hospital Services:* It was reported that the new Director of Hospital Services had suggested that the Association appoint two or three representatives to attend the quarterly meetings of Hospital Superintendents with the Director. The suggestion had been agreed to, but so far no meeting had been held owing to the absence overseas of the Director of Hospital Services. *Noted.*

41. *Radiological Appointments and Emoluments:* It was reported that the position was not considered to be satisfactory in the Orange Free State and that discussions were taking place regarding the opening of Provincial hospitals to all radiologists practising in the Province. *Noted.*

Dr. Theron then proposed the adoption of his Report. Council *Agreed* accordingly.

REPORT OF THE EXECUTIVE COMMITTEE AUGMENTED FOR THE TRANSVAAL

42. *The Position of a Specialist in Physical Medicine Holding a Part-time Appointment at a Public Hospital vis-à-vis Private Inpatients Referred to the Physiotherapy Department of such Hospital for Specific Treatment:* It was reported that this matter had been discussed and that the Committee had agreed to recommend to Council that it resolve —

(a) To accept the necessity for the ruling by the Director of Hospital Services to the effect that a specialist in physical medicine in charge of a department in a public hospital must be responsible for all physiotherapeutic treatment administered in that department;

(b) that a medical practitioner who himself prescribes treatment for his private patient to be administered by the staff attached to the physiotherapy department of a public hospital should accept the fact that the approval of the specialist in physical medicine in charge of that department is necessary before the treatment can be administered;

(c) that a part-time specialist in physical medicine in charge of the physiotherapy department of a public hospital must not charge a fee to a private patient referred to the department for treatment where such treatment has already been prescribed by the doctor in charge of the patient, but that he may, however, charge a fee in those cases where his advice concerning the treatment has been specifically sought.'

It was further reported that these recommendations had received the approval of the South African Society of Specialists in Physical Medicine.

Council *Resolved* accordingly.

43. *Objection to the Rendering by the Province of a Radio-graphic Service to non-Radiologists:* It was reported that the Committee had considered this matter and had again met a

deputation from the Radiological Society of South Africa for discussion of the subject. The Committee had agreed to recommend to Council, 'That no further action be taken by the Association in connection with the rendering by the Province of a radiographic service to non-radiologists, until such time as the report of the Government Commission of Enquiry into Ionizing Radiation becomes available'. It was further reported that the Radiological Society of South Africa had agreed to support this recommendation.

Council Resolved accordingly.

44. *Objection to the Present Regulations of the Province in Connection with the Collection of Fees from Private Patients Radiologically examined in Provincial Hospitals:* It was reported that at the request of the Radiological Society of South Africa a deputation from the Committee, accompanied by representatives of the Society, had interviewed the Acting Director of Hospital Services. The result of the interview was contained in the Report which had already been circulated to Council. Later the Committee had agreed to note the Report and to await an official written reply from the Director of Hospital Services to a letter addressed to him by the Assistant Secretary, before taking any further action. *Noted.*

45. *Shortage of Teaching Material in Transvaal Provincial Hospitals:* It was reported that, in response to an invitation by the Committee for advice as to the best method by which the Association could assist the University of the Witwatersrand in its efforts to overcome the shortage of clinical material for teaching purposes available at the Johannesburg General Hospital, the Registrar of the University had replied that 'the only remedy possible to correct the deficiency would seem to be the exclusion of teaching wards from the operation of paragraphs 34 and 35 of the Hospitals Ordinance, so that every patient admitted to these wards would be treated by the teaching staff of the hospital and be eligible for outpatient treatment, irrespective of his income and classification'. After consideration of this reply, the Committee had agreed to inform the Registrar —

- (a) that, with the information at its disposal, the Committee is not convinced that the exclusion of teaching hospitals from the operation of paragraphs 34 and 35 of the Hospitals Ordinance is the only possible method of overcoming the shortage of clinical material for medical education;
- (b) that the Committee would therefore prefer to meet the University authorities for a general discussion on the problem before finalizing its recommendation to Federal Council.'

Dr. Turton drew attention to the additional annexure containing the report on the subsequent meeting between the Committee and representatives of the University Council. Lengthy discussion followed, and finally Council *Agreed* to support the proposal to reopen the non-European Hospital in Johannesburg in order that additional teaching material could become available. Dr. Geerling asked that his vote be recorded against this motion.

Dr. Turton then moved the recommendation of the Committee, contained in the additional annexure, 'That the Federal Council should join with the University in asking the Government to appoint a Commission of Enquiry to investigate urgently the problem of the shortage of clinical teaching facilities in the Johannesburg Hospital, which serves as the main teaching hospital of the Witwatersrand University Medical School'. This was put to the vote and *Carried Nem. Con.*

46. *Discrimination in Salary Scales Against Anaesthetists and Paediatricians:* It was reported that this matter had been discussed at the last meeting of Council and had been referred to the Augmented Executive Committees in the other Provinces. The Committee reported further that there was no discrimination in the salaries paid to anaesthetists and paediatricians attached to teaching hospitals in the Transvaal. *Noted.*

47. *Posts of Director and Deputy Director of Hospital Services in the Transvaal — Qualifications and Remuneration:* It was reported that the Committee, at the request of the Hospital Administrators' Group, had made representations to the

Province in connection with the qualifications and remuneration attaching to the posts of Director and Deputy Director of Hospital Services. A memorandum containing the representations had been submitted, *via* the Acting Director of Hospital Services, to the Administrator-in-Executive Committee. It was anticipated that the Committee would in the near future be afforded an opportunity of interviewing the Administrator-in-Executive Committee in order to elaborate on the memorandum. *Noted.*

48. *Concessions by the Province in Connection with the Hospitalization of Insured persons Requiring Open-heart Operations:* It was reported that the Committee had considered representations made by thoracic surgeons practising in the Transvaal, in connection with certain difficulties experienced by these surgeons and their private patients as a result of —

- (a) the '5% clause' contained in the regulations promulgated in terms of the Hospitals Ordinance;
- (b) the lack of hospital beds for private patients in Johannesburg;
- (c) the high fee of R90 charged by the Province for the use of the heart-lung machine.

After discussion, the Committee had resolved that it would request the Provincial authorities —

- (1) To allow the admission of private patients of thoracic surgeons to the 35 beds hired by it in the Florence Nightingale Nursing Home in the same manner and under the same conditions at present applicable to private patients admitted to the Pretoria General Hospital;
- (2) to amend Regulation No. 13 (containing the '5% clause') of Administrator's Notice No. 638 dated 29 August 1958, in a manner which would preclude the possibility of persons in the high income group, who can well afford to pay for private medical services, from obtaining these services from the Provincial Administration free of charge;
- (3) to reduce substantially the fee of R90 at present levied by the Province on private patients for the use of the heart-lung machine.'

The Committee had also resolved that it would inform the Provincial authorities that it was of the opinion that all special departments attached to the Johannesburg General Hospital which were at present housed in various nursing homes in Johannesburg should, at the earliest possible opportunity, be accommodated within the grounds of the Johannesburg General Hospital itself.

It was further reported that these resolutions of the Committee had been submitted to the Director of Hospital Services in writing, with the request for an interview in order to allow the Committee to explain fully the reasons which had prompted its representations. *Noted.*

49. *Surgical Appointments to Transvaal Provincial Hospitals:* It was reported that a communication had again been received from the Association of Surgeons with the request that only registered surgeons be appointed to posts of surgeon in Provincial hospitals. On a former occasion the Committee had recommended to Council that this request be not supported. In bringing the matter to the notice of Council on this occasion, the Committee had agreed to recommend to Council, 'That the Association of Surgeons be informed that it is the existing policy of both the Association and the Province that all appointments to hospital posts be made primarily on merit'.

In the discussion which followed, there was general agreement that this policy was fair to all. The recommendation of the Committee was then put to the vote and *Carried.*

50. *Salary Scales — Clinical Assistants in Transvaal Provincial Hospitals:* It was reported that the Committee had considered a letter received from the Association of Clinical Assistants requesting support for representations to be made to the Province for an increase in the salary scales applicable to clinical assistant posts in Transvaal Provincial hospitals. The Committee had discovered, however, that the Administrator-in-Executive Committee had already approved of increased salary scales for clinical assistants, and that the new scales corresponded with those applicable in other Provinces.

The new scales were to be implemented as soon as certain administrative difficulties had been overcome. The Committee had resolved, therefore, that in view of the fact that the Administrator-in-Executive Committee had already agreed to an increase in the salary scales applicable to clinical-assistant posts in Transvaal Provincial Hospitals, no action by the Association in support of the representations already made by the Association of Clinical Assistants was necessary. *Noted.*

51. *Re-organization of the Medical Staff Establishment of the Krugersdorp Hospital:* It was reported that the Committee had taken action in this regard, and a report of the action taken had appeared in the Committee's Minutes. Confirmation was sought. Council *Resolved* accordingly.

52. *Appointment of Part-time Neuro-Surgeon — Johannesburg Hospital:* It was reported that the Committee had taken action in this matter, and a report of the action taken had appeared in the Committee's Minutes. Confirmation was sought. Council *Resolved* accordingly.

53. *Remuneration of Medical Officers by the Province for After-hours Work:* It was reported that the Committee had taken certain action in this regard, and a report of the action taken had appeared in the Committee's Minutes. Confirmation was sought. Council *Resolved* accordingly.

Dr. Turton then moved the adoption of his Report. Council *Resolved* accordingly.

54. *Notice of Motion by Dr. Troskie and Dr. van der Riet:* 'Dat hierdie Federale Raad sy primêre doelstellings be spreek met die doel om die balans te herstel tussen die „bevordering van die geneeskunde en verwante wetenskappe en eer van die mediese beroep" aan die een kant, en „die bevordering van die finansiële belang van die beroep" aan die ander.'

In the discussion which followed, several members supported the sentiments contained in the notice of motion; but it was also pointed out that, although the Council had of necessity to spend much time in the discussion of financial considerations, a great deal of time was spent by the Association in its Branches and Groups in the discussion of the art and science of medicine, so that if one considered the whole aspect of the Association's activities a reasonable balance was maintained.

Finally Council *Resolved* that the notice of motion be *Noted* with appreciation.

55. *Holder of Benefit Society Appointment Employing Assistant or Sharing Work with Partner, and Necessity of Advertising such Work as Additional Post:* This matter had been held over from the Report of the Executive Committee. A memorandum prepared by the Executive Committee on this subject had been circulated. After short discussion it was proposed by Dr. Frootko, seconded by Mr. Mackenzie and *Resolved Nem. Con.* that the memorandum prepared by the Executive Committee be *Approved*.

(A copy of the memorandum will be published in the Journal in due course.)

REPORT OF THE HEAD OFFICE AND JOURNAL COMMITTEE

56. *Hamilton-Maynard Memorial Medal:* Dr. Sichel presented the Report. He stated that the Committee had awarded the Hamilton-Maynard Memorial Medal for 1960 to Prof. C. Lewer Allen in recognition of his paper entitled 'The University of Cape Town Artificial Limb' which had been published in the *Journal* of 13 February 1960. *Noted.*

57. *Subscriptions for Full-time Employed Medical Personnel:* It was reported that a letter from the Honorary

Treasurer of the Natal Coastal Branch had been considered, and as a result the Committee had agreed to recommend to Council—

'That the subscription rate for full-time employed medical personnel be R12.00 per annum, R8.00 of which would be retained by the Head Office as the Association subscription and R4.00 be payable to Branches as the Branch annual subscription except where Branches felt that they only required a lesser amount than R4.00 from such members.'

In view of the resolution contained in Minute 20 above, Council *Resolved* that this matter be referred back to the Committee for further investigation.

58. *Grant to Medical Library — University of Natal:* It was reported that the Committee had considered a letter and memorandum from the Natal Coastal Branch in support of a request for an increase in the medical library subsidy paid to the University of Natal. Copies of the letter and memorandum were submitted. The Committee had agreed to recommend to Council that no action be taken in this matter at this stage.

After discussion, an amendment was proposed that the matter be referred back to the Committee for further consideration. On being put to the vote, this amendment was *Lost.*

The recommendation of the Committee was then put to the vote and was *Carried* by 27 votes to 10. Drs. Adler, Disler, Frootko, Gluckman, Pooler, Roberts and Zabow asked that their votes be recorded against this resolution.

59. *Association Tie:* It was reported that the Committee had considered the suggestion that a distinctive 'club' tie be produced to be worn by members of the Association, and that any profits which might accrue from the sale of such a tie be devoted to the Benevolent Fund. Enquiries had shown that both ties and 'chokers' were obtainable. The Committee suggested further that orders on a 'cash with order' basis should be placed. Accordingly it had agreed to recommend to Council—

- (1) That an Association tie be produced in two qualities — pure silk quality to sell at R3.00, and terylene quality to sell at R2.25 — and that if there is a sufficient demand, a "choker" in pure silk mixture be produced at R3.00.
- (2) That if Council accepts this suggestion, orders be placed with the Head Office through the Branches on a "cash with order" basis.

After short discussion Council *Resolved to Accept* the suggestion of the Head Office and Journal Committee in principle, and to leave it to the Committee to decide on designs and samples. It was further reported that the Executive Committee had suggested that a blazer badge also be designed, and it was left to the Head Office and Journal Committee to consider this suggestion.

60. *'Family Doctor':* It was reported that an offer had been made to the Association by the Managing Editor of *The South African Family Doctor* to take over that magazine at a cost of R15,000. Since the offer had been made, a newspaper report had stated that the publication had gone into provisional liquidation. In the meantime a representative of the *Family Doctor* published by the British Medical Association was visiting South Africa. The Chairman reported on a meeting which had taken place on the previous afternoon.

After discussion Council *Resolved* that the matter be referred back to the Head Office and Journal Committee in order that it might make a recommendation to Council at a later date if it so wished.

Council adjourned at 6 p.m.

(to be continued)

UNIVERSITEITSNUUS : UNIVERSITY NEWS

UNIVERSITY OF NATAL EXAMINATION RESULTS

The following candidates have completed the requirements for the M.B., Ch.B. degrees of the University of Natal:

Ameen, H. M.
Cakata, A. I.
Domingo, J. R.

Govind, V.
Jeewa, G. H. M.
Khutsoane, M. L.

Kraai, T. D.
Mabaso, D. J. J.
Mokgokong, E. T.
Noah, P. P. N. (Miss)

Pitsoe, S. B.
Rangiah, D.
Reddy, A. (Miss)

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SUID-AFRIKAANSE GENEESKUNDIGE EN TANDHEELKUNDIGE RAAD : SOUTH AFRICAN MEDICAL AND DENTAL COUNCIL

The 74th meeting of the South African Medical and Dental Council was held in the Council Chamber, Cape Town Chamber of Commerce, Barclay's Bank Building, Adderley Street, Cape Town, on 2-5 October 1961. The proceedings occupied 8 half-day sessions. The President (Prof. S. F. Oosthuizen) was in the chair, and 27 members were present, together with the Registrar (Mr. W. H. Barnard) and his staff.

PRESIDENT'S OPENING STATEMENT

The President confined his remarks, in the main, to a survey of his recent overseas visit.

Reciprocity

While in Britain, Professor Oosthuizen had discussions with the Presidents of the General Medical Council and the General Dental Council on the question of continued reciprocity between Great Britain and South Africa in view of the changed constitutional circumstances of this country. He was pleased to be able to report that both Councils supported the continuance of reciprocity, and negotiations to that end were successfully concluded. It was possible that South African practitioners would be placed on the foreign list in future instead of on the Commonwealth list; this would only be a change of form. The same privileges appertained to both lists. An Order-in-Council would have to be made by the Privy Council in this connection, and this would be done later, when other constitutional matters between the two countries came up for review and alteration.

Universities

Professor Oosthuizen mentioned that it was the practice in Britain to appoint only full-time professors in the medical faculties of the universities.

Registration in Britain

Information was given to Professor Oosthuizen that in January of this year more South African doctors registered with the General Medical Council than in the whole of 1960. It was stated that most of these doctors stayed only a short while in Britain.

REGISTRATION

The Registrar reported on registrations during the first six months of 1961 as follows (figures in brackets refer to the same period in 1960):

Medical practitioners 141 (156), medical practitioners restored 17 (11); interns 46 (38), interns restored 1 (0); dentists 4 (9), dentists restored 3 (2); medical specialists 52 (58); dental specialists 1 (1); medical students 359 (330), medical students re-registered 6 (6); dental students 45 (32), dental students re-registered 1 (2); medical auxiliaries 236 (68), medical auxiliaries restored 1 (0). The large increase in medical auxiliaries was mainly due to the registration of 147 optometrists.

At 30 June 1961 there were 8,034 medical practitioners and 1,294 dentists on the register.

Removal from register. At their own request 42 doctors and 21 dentists had their names erased from the register.

Limited registration. The Council approved the registration under Government Notice No. 256 of 1947, as amended, of three doctors to work at mission hospitals, and extended the registration of one doctor to practise at a mission hospital for a further period of five years. Three applications for registration under this section were not approved.

Specialist registration. At this meeting 22 applications for registration as specialists were approved, 26 were approved subject to compliance with specific requirements, and 18 applicants were informed that further information was necessary before their specialties could be registered.

Higher qualifications. The Fellowship of the Faculty of Pathologists, College of Physicians, Surgeons and Gynaecologists of South Africa, was recognized as a higher qualification for the registration of specialties. The M.D. degrees of Netherland universities were accepted as higher qualifications only if obtained subsequent to having obtained the Arts Examen of that country. The qualifications of the following Specialty

Boards in the USA were recognized as higher qualifications for the registration of specialties: Anesthesiology, Dermatology, Internal Medicine, Ophthalmology, Otolaryngology, Psychiatry and Neurology, Pathology, and Thoracic Surgery. In the case of the following Boards, the qualifications were not recognized, but each case would be dealt with on its merits as applications for recognition thereof were received: Obstetrics and Gynaecology, Physical Medicine, Plastic Surgery, Neurosurgery, and Radiology (diagnostic and therapeutic).

Additional qualifications. The degree of Ph.D. (Med.) of the University of Stellenbosch was added to the list of additional qualifications, as was the Diploma of F.F.A.R.C.S. Irel.

Maldistribution of Doctors

This problem was discussed once again at this Council meeting. Prof. H. Grant-Whyte suggested that the Commission on the High Cost of Medical Services might consider an adequate State subsidy for general practitioners and specialists who were prepared to work in unattractive and outlandish areas. Dr. L. O. Vercueil said that there were too many specialists and that full-time posts in hospital were so attractive to doctors that very few went into private practice. Prof. H. W. Snyman pointed out that the small European population had to supply the bulk of the doctors for the whole country, owing to the great shortage of non-European doctors. He was pleased to see that there was an increase in the number of medical students.

TREASURER'S REPORT

The treasurer, in submitting his report, informed the Council that the amount by which expenditure had exceeded revenue in the period covered by his report was R19,000. He said that if this trend continued it might be necessary for the Council to appoint an *ad hoc* committee some time in the future to look into ways of decreasing expenditure or increasing revenue.

RECIPROCITY

Reciprocity with the United Kingdom. The Council noted a statement from the Registrar setting out details of the negotiations undertaken by Professor Oosthuizen on its behalf while in Britain. The main points in it were covered in the President's opening statement (see above).

Reciprocity with the Federation of Rhodesia and Nyasaland. The Southern Rhodesia Medical Council had informed the Council that the *status quo* regarding registration of South African degrees in Southern Rhodesia would be maintained after 31 May 1961 pending suitable legislation being introduced permitting continuation of registration of South African medical and other degrees. A similar position applied to Northern Rhodesia and Nyasaland.

ETHICAL RULES 19 AND 19 (BIS)

At an earlier meeting, the Council had decided to amend rules 19 and 19 (bis), concerning the advertising of professional appointments, to read that an advertisement for such professional appointments should appear in the *South African Medical Journal* or in the *Journal of the Dental Association of South Africa*, among other amendments. These were sent to the Minister of Health for approval and promulgation, but the Minister did not see fit to promulgate the amendments.

After considerable discussion, the following amendment was accepted by the Council for submission to the Minister:

'An advertisement for a professional appointment for a medical practitioner could appear in one or more medical journals provided that one such journal is the official organ of the Medical Association of South Africa, and for a dentist in one or more dental journals provided that one such journal is the official organ of the Dental Association of South Africa.'

DIFFERENTIATION IN SALARY SCALES IN RESPECT OF EUROPEAN AND NON-EUROPEAN MEDICAL PRACTITIONERS

Following receipt of a letter from the Medical Graduates' Association of the University of Natal, the Executive Com-

mittee of Council resolved that the Acting President of Council be requested to ascertain from the Minister of Health whether he was of opinion that the time was now opportune to receive a deputation from the Council in connection with this matter, as previously requested by Council. The action of the Executive Committee was confirmed by Council.

PROCEDURE FOR PERSONS APPLYING FOR RESTORATION TO THE REGISTER AFTER DISCIPLINARY ERASURE

Council accepted the following motion concerning the procedure to be followed in such cases:

'That on receiving an application from a person for restoration to the register after disciplinary erasure, it be an instruction to the Registrar to forward with the agenda for the next full meeting of Council all relevant information concerning such an application. Such applications are to be considered by Council at an early stage during that meeting.'

ADMINISTRATION OF ANAESTHETICS DURING ELECTROCONVULSANT THERAPY

Council decided that its policy in connection with assistance at operations should also apply in the case of psychiatrists administering anaesthetics for patients subjected to electroconvulsive therapy and other procedures. In essence this means that a medical practitioner, in addition to the psychiatrist, must be present to administer the anaesthetic, attend to the patient, and safeguard the patient against possible complications.

DISCIPLINARY MATTERS

Council confirmed the action and findings of various Disciplinary Committees in respect of three doctors and one dentist. In all cases the persons concerned were either cautioned or cautioned and reprimanded.

Council discussed the action and findings of the Disciplinary Committee which enquired into the conduct of Drs. J. L. H.

CAPE MEDICAL PLAN

The inaugural meeting of the Cape Medical Plan was held in the Physiology Lecture Theatre, University of Cape Town, on 17 November 1961. It was the culmination of several months of preliminary activity following the interest shown by many doctors in the Cape Western area in the formation of a plan for prepaid medical care, based on the Medical Services Plan, which was inaugurated in the Transvaal as a pilot scheme 2½ years ago. In April 1961 an interested meeting of Cape Town doctors had elected a Steering Committee to bring the Medical Services Plan to the Cape or to form a similar Plan in their area.

At the inaugural meeting in Cape Town, attended by approximately 120 doctors, the Chairman of the Steering Committee outlined the various steps which had led to this inaugural meeting, and explained the aims and objects of the Plan. He stated that Federal Council, at their recent meeting, had approved the principle of sponsorship being extended to the Cape Medical Plan and had delegated this responsibility to the Cape Western Branch Council.

In terms of the Constitution of the Plan, the Cape Western Branch Council had elected as the Board of Directors the members of the *ad hoc* Steering Committee, viz. Drs. H. Claassens, M. Fredman, M. Helman, F. E. Hofmeyr, J. R. E. Lee, J. G. Louw, P. C. W. Madden, A. A. Meyer, C. Shapiro, P. Suckling and A. A. Zabow.

The following resolutions were passed at the meeting after numerous questions had been put from the floor and dealt

and W.A.M. It confirmed the findings and sentenced both doctors to be suspended from the register for a period of three months.

Dr. M.N.G. had his name restored to the register.

MISCELLANEOUS

Treatment in hospital by a general practitioner and a specialist. Following a request for a ruling on treatment in hospital of a patient by a general practitioner after the patient had been handed over to a specialist for treatment, Council ruled as follows: 'That when a practitioner places a patient in the hands of a second practitioner, the first practitioner is entitled to charge for visits made or services rendered only at the express wish of either the patient or the second practitioner, with the consent of the patient.'

1960 addendum to British Pharmacopoeia, 1958. Council agreed that the 1960 addendum to the British Pharmacopoeia should be recognized for the purpose of section 79 of the Medical, Dental and Pharmacy Act, 1928, from a date six months after the date of publication of the 1960 addendum.

Intern training. Council adopted a motion to the effect that the criteria pertaining to the training of interns be referred to the Medical and Dental Education Committee for review.

Requests for information. The following motion was carried in connection with requests by the Council for information: 'That in replying to requests for information from medical practitioners, the Executive Committee be requested to attempt as far as possible to answer the questions on general principles, while at the same time indicating specifically that it is not prejudging a particular case, rather than refusing information on the grounds of prejudging.'

Preclinical courses. The courses in botany, chemistry, physics and zoology at the various non-European University Colleges of the University of South Africa, were accepted as suitable under the relevant regulations for these courses.

Next meeting of Council. The next meeting of Council will be held in Cape Town, beginning on Monday 12 March 1962.

with by the Chairman and other members of the Committee who were present:

1. That this meeting of doctors agrees to the formation of a friendly society with the objects as authorized in the Constitution, which has been circulated, and accordingly constitutes itself as a friendly society, known as the Cape Medical Plan.

2. That this meeting ratifies the Constitution of the Cape Medical Plan.

3. That this meeting ratifies the Board of Directors appointed by the Cape Western Branch in terms of the Constitution of the Cape Medical Plan.

4. That this meeting ratifies the Participating Member's Contract of the Cape Medical Plan.

5. That this meeting ratifies the Subscriber's Contract of the Cape Medical Plan.

It is hoped that all doctors who reside or practise in the area which the Plan will serve, viz. Cape Town and suburbs, Bellville, Stellenbosch, Paarl, and Somerset West, will become participating doctors, since the Plan will be underwritten and administered by the medical profession. Doctors who intend joining the Plan are requested to complete their Participating Member's agreement (posted to them last month) and to return it, together with a cheque for R40, to the Plan's offices, 9th floor, Medical Centre, Cape Town, as soon as possible, so that the Board will have the necessary finances to plan expenditure and development.

DIE SUIDELIK-AFRIKAANSE HARTVERENIGING: TAK STELLENBOSCH

Op 2 November is 'n gesamentlike byeenkoms gehou in die Groot-Voorleessaal, Karl Bremer-hospitaal, van die Tak Stellenbosch van die Vereniging (as gasheer) en die Tak Kaapstad.

Dr. L. Vogelpoel het as spreker die Kaapstadse groep ver-

teenwoordig met 'n uitstekende geillustreerde voordrag, en daarna het dr. F. P. Retief die ondervinding met antistol-middels by die Karl Bremer-hospitaal ontleed.

Aangesien die werk van dr. Vogelpoel en sy medewerkers reeds in die pers is, word dit hier by wyse van 'n voorlopige verslag gerapporteer:

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Variations in the Response of the Systolic Murmur to Vasoactive Drugs in Ventricular Septal Defect, with Special Reference to the Paradoxical Response in Large Defects with Pulmonary Hypertension — by Drs. L. Vogelpoel, V. Schrire, W. Beck, M. Nellen, and A. Swanepoel.*

In ventricular septal defect (VSD) the response of the systolic murmur to amyl nitrite and phenylephrine varies considerably and is determined by the responsiveness of the pulmonary resistance vessels to these drugs. The behaviour of the murmur forms the basis of a new pulmonary vascular function test.

When a VSD systolic murmur softens after amyl nitrite and intensifies after phenylephrine, a small or moderate sized defect with a pulmonary systolic pressure under 50 mm.Hg can be diagnosed. The murmurs behave thus because the pulmonary arterial pressure responds weakly (as in health), whereas the systemic pressure responds powerfully, resulting in marked changes in systolic gradient and hence in flow across the defect.

When a VSD systolic murmur behaves in the opposite fashion, intensifying after amyl nitrite and softening after phenylephrine, a large VSD with hyperkinetic pulmonary hypertension can be diagnosed. The murmur behaves paradoxically because the pulmonary resistance vessels, being endowed with excessive smooth muscle, respond powerfully to the drugs. Amyl nitrite results in a greater fall in pulmonary than systemic systolic pressure with increased left-to-right shunt-flow and murmur, suggesting a greater reduction in pulmonary than systemic vascular resistance. Phenylephrine produces exactly the reverse effect. The more severe the pulmonary hypertension, the greater the paradoxical response, whereas in moderate pulmonary hypertension the murmurs may fail to change.

The value of the paradoxical response is that it denotes a labile pulmonary vascular resistance, and therefore a favourable prognostic indication that the pulmonary arterial pressure will fall after surgery. In Eisenmenger's complex, where advanced obliterative pulmonary vascular disease is

present, the relative lack of lability can be demonstrated with these drugs.

Ondervinding met Antistolmiddels by die Karl Bremer-hospitaal, deur dr. F. P. Retief

Nadat die organisasie van die plaaslike antistol-kliniek geskets is, is 'n oorsig gegee van die groei van die kliniek sedert die ontstaan van die Karl Bremer-hospitaal in 1956. Op die oomblik (Oktober 1961) is 189 pasiënte, die oorgroe meerderheid waarvan buite-pasiënte is, op langtermyn-behandeling. Gedurende die tydperk Julie 1956 tot Oktober 1961 is 425 pasiënte met antistolmiddels behandel; 'Coumadin' ('warfarin') is in 89% gebruik, 'dinevan' in 8% en 'tromexan', 'didandin' en dicoumarol in enkele gevalle. Bevindings met hierdie groep is verder ge-analiseer met klem op 173 langtermyn-pasiënte wat oor 1,910 pasiënt-maande behandel is. Hoewel syfers nie statisties betekenisvol was nie, het dit tog die indruk geskep dat kontrole met coumadin gladder was as met dinevan, en dat weerstand daarteen meer selde voorkom. Behalwe vir enkele gevalle van vallellergie, was bloedingsinsidente die enigste komplikasies van belang; dit het by 18.7% van die pasiënte voorgekom — as makroskopiese hematurie in 'n derde van gevalle, en as subkutane en binnespierse bloeding in 'n derde. Die res het intestinale bloeding, epistaks, hemoptise, vaginale bloeding, ens. ondervind. Drie pasiënte het serebro-vaskuläre ongelukke ontwikkel en 2 is oorlede. Ongelukkig was die P.I. nie beskikbaar in hierdie gevalle nie. Geen ander fatale bloedings is ondervind nie. Ongeveer die helfte van die bloedings was geassosieerd met 'n P.I. binne of bo die terapeutiese grense. Laastens is ons beperkte ondervinding met die Thrombotest (Owen) bespreek. Hoewel dit 'n heelwat duurder bepaling is as die Quick metode, skyn kontrole veel veiliger te wees.

Albei voordrage het lewendige belangstelling uitgelok soos geblyk het uit die besprekking. By wyse van uitsondering, het die voorsitter vir prof. A. J. Brink gevra om die sprekers te bedank. Prof. Brink het gewys op die uitstekende illustrasies van dr. Vogelpoel se voordrag en die feit dat hy weer eens die laboratorium tot by die bed gebring het om die kliniese verskynsels in fisiologiese terme te verklaar. Dr. Retief se voordrag het die geleentheid gebied om die ondervinding met antistolmiddels en die administrasie van die groterwordende kliniek oor 'n 5-jaar periode te beoordeel.

* From the Cardiac Clinic, Groote Schuur Hospital and C.S.I.R. Cardiopulmonary Research Group, Department of Medicine, University of Cape Town.

IN DIE VERBYGAAN

Dr. E. W. Turton, van Boksburg-Noord, is in die onlangs verkiezing gekies tot lid van die Mediese Raad in die plek van dr. James Black wat bedank het.

Dr. E. W. Turton, of Boksburg North, was elected a member of the Medical Council at its recent election to fill the vacancy created by the resignation of Dr. James Black.

* * *

Museum of the History of Medicine, University of the Witwatersrand, Johannesburg. One of the first steps in the formation of the Museum of the History of Medicine will be the collection of a complete set of books published by South African practitioners. It is essential that these be deposited in the Archives of the Museum, and they may well form the basis of exhibitions of such publications from time to time.

It would be greatly appreciated if doctors who have published books would assist by sending an autographed copy to Dr. Cyril Adler, 701 Ingram's Corner, Twist Street, Hospital Hill, Johannesburg.

* * *

Burroughs Wellcome and Co. (S.A.) Ltd., 130 Main Street, Johannesburg, have issued a complete price list of laboratory diagnostic reagents and materials. Copies have been distributed to all pathologists and medical technicians on their mailing list, and they will gladly send a copy to anyone else who applies for it.

BOEKES ONTVANG : BOOKS RECEIVED

Study Group on Arthropod-borne Viruses. World Health Organization Technical Report Series, No. 219. Pp. 68. 50c. Pretoria: Van Schaik's Bookstore (Pty) Ltd. 1961.

Problems of Hereditary Chondrodysplasias. By Andreas Hobaek. Pp. 175. Illustrated. R5.40. Norway: Oslo University Press. 1961.

Public Health Aspects of Low Birth Weight. Third Report of the Expert Committee on Maternal and Child Health. World Health Organization Technical Report Series, No. 217, Pp. 16, 17½c. Pretoria: Van Schaik's Bookstore (Pty.) Ltd. 1961.

Vasco-Seminal Vesiculography in Hypertrophy and Carcinoma of the Prostate with Special Reference to the Ejaculatory Ducts. A clinical and experimental roentgenological study. By Gunnar Willer Vestby. Pp. 194. Illustrated. Norway: Oslo University Press. 1960.

IN MEMORIAM

NORMAN HENRY GUSTAVE CLOETE, M.B., CH.B. (EDIN.)

Dr. F. Krone, of Cape Town, writes:

Dr. Norman Cloete's sudden death following an emergency operation on 22 October came as a great shock to his relatives and friends. We knew that he had been far from well for some time, but did not expect the end so suddenly.



Dr. Cloete

I knew Norman intimately during his student days, and later while he was in Cape Town. We were together at the old South African College, Cape Town, and went overseas together in 1916 to Edinburgh for our medical studies, where we 'digged' together for quite a while. After obtaining his M.B., Ch.B. degree, Norman devoted a lot of his time to surgery at the Stockton-on-Lees Hospital where he also met his wife, Florence.

For approximately 28 years Dr. Cloete was in Oudtshoorn where he had a large general practice. He was conscientious,

hardworking, able, and an outstanding general practitioner. During World War II he enlisted and became a Major in the South African Medical Corps. After the war he came to Cape Town, where he was at first Assistant Medical Superintendent and later Medical Superintendent at Groote Schuur Hospital, succeeding the late Dr. B. M. J. de Wet, the first Superintendent. When he reached retiring age, he was appointed Medical Officer at the Wynberg Military Hospital.

Although lately he was a very sick man, and we knew it as well as he did, he was always very plucky and cheerful and he insisted on working to the very end — in fact until 2 days before his death.

Dr. Cloete faithfully fulfilled the Hippocratic Oath to serve his fellowmen to the best of his ability. I admired his pluck, determination, cheerful temperament, sincerity and sense of duty. He was the type of doctor of whom the Medical Profession can be proud.

We can say of Norman: 'Well done, thou noble and faithful servant'. To Mrs. Cloete and the children, we extend our sincere sympathy, and may the memories of his constant devotion be a source of comfort to them during sad and troubled days.

I have lost an old and very sincere friend.

NUWE PREPARATE EN TOESTELLE : NEW PREPARATIONS AND APPLIANCES

PRO-ACTIDIL

Burroughs Wellcome & Co. (South Africa) Ltd. announce the introduction of 'Pro-Actidil' and supply the following information:

Pro-Actidil brand tablets are a new presentation of Actidil brand triprolidine hydrochloride, the most potent and safe antihistamine available.

Composition: Each Pro-Actidil tablet contains 10 mg. of triprolidine hydrochloride divided between 3 layers of a specially devised excipient which provides for a rapid onset of action, followed by a sustained release of the drug to give a therapeutic effect lasting up to 24 hours in most patients.

The outer layer of a Pro-Actidil tablet contains 2.5 mg. triprolidine hydrochloride and has a rapid onset of action and duration of effect similar to that of an ordinary Actidil tablet. A good therapeutic level is maintained for 4-6 hours.

The intermediate layer contains 5 mg. triprolidine in a specially formulated, slowly digestible base. The antihistamine effect of this layer begins before that of the outer layer has diminished, and lasts for 11-12 hours. The central core, which contains 2.5 mg. triprolidine, is released towards the end of that time. This last section continues the powerful antihistamine effect for a further 4-6 hours.

Indications: Pro-Actidil is indicated in all conditions in which a prolonged sustained antihistaminic effect is required, especially in allergic dermatoses, urticaria, seborrhoeic eczema, angioneurotic oedema, and pruritis. Other conditions in which Pro-Actidil is useful are vasomotor rhinitis, hay fever — particularly nocturnal and early-morning attacks — and allergic asthma associated with bronchospasm.

Dosage: For adults, and children over 10 years, one Pro-Actidil tablet swallowed whole every 24 hours — preferably between 6 and 7 p.m.

Further information is obtainable from Burroughs Wellcome & Co. (S.A.) Ltd., P.O. Box 10293, Johannesburg.

ELASE

Parke, Davis have recently introduced Elase, a combination of 2 proteolytic enzymes to promote the healing of a variety of

exudative skin and mucous membrane lesions, and supply the following information:

Description: Elase combines fibrinolysin (to provide active enzymatic action for fibrin debridement) with desoxyribonuclease (to lyse desoxyribonucleic acid in leucocytes and other nuclear debris).

Ideally, an agent or combination of agents for effective debridement should provide a spectrum of activity sufficiently broad to remove all forms of necrotic tissue; a span of action long enough to eliminate the need for too-frequent dressings; and a sphere of action that confines itself to nonviable material and does not include action on living tissue. Although a preparation having all of these characteristics has not yet been developed, considerable interest has been directed recently to the proteolytic enzymes fibrinolysin and desoxyribonuclease derived from bovine sources. At present the combination of these two enzymes as in Elase seems to offer the most promise as an effective debriding agent.

Indications: Elase is especially useful for the removal of exudates and necrotic debris issuing from wounds, ulcers or burns, and in the irrigation of abscess cavities, haematomas, sinus tracts and fistulas. It is of similar benefit intravaginally where, among other effects, it promotes rapid removal of necrotic debris associated with vaginitis and cervicitis.

Dosage and Administration: Since the conditions for which Elase is helpful vary considerably in severity, dosage must be adjusted to the individual case.

Side-effects: Side-effects have been minimal, consisting entirely of local hyperaemia. The usual precautions against allergic reactions should be observed, particularly in persons highly sensitive to material of bovine origin.

Contraindications: Elase is not recommended for parenteral use since the bovine fibrinolysin may be antigenic. There are no known contraindications to topical use as already recommended.

Presentation: Elase is supplied in the following forms: (1) A lyophilized powder in sterile vials. (2) An ointment in 10-G. tubes. (3) An ointment in 30-G. tubes.

Further information may be obtained from Parke, Davis Laboratories (Pty.) Ltd., P.O. Box 24, Isando, Tvl.